AMERICAN ARTISAN

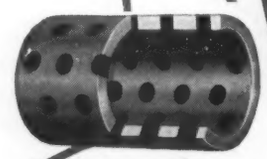
SEPTEMBER
1942

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

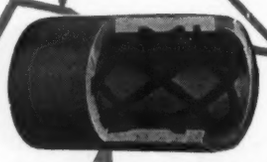
ESTABLISHED
1880

YOUR EQUIPMENT WILL TURN FOR VICTORY

WITH Randall BEARINGS

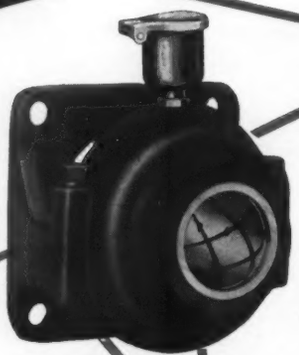


Here are cut-a-way sections of two of many types of Randall Graphite Bronze Bushings.



Randall Graphite Bronze Bushings can be used in connection with oil reservoirs.

Randall Universal, Self-Aligning, Self-Lubricating Pillow Block.



Randall Flange or Side Mount, Self-Aligning, Self-Lubricating Pillow Block.

America's job is tough enough at best without taking unnecessary chances. One way to safeguard production is to use bearings that will see us through—that won't give up in the middle of a vital war job.

Randall Sleeve Type Graphite Bronze Bearings and Pillow Blocks are designed for tough assignments where failure can't be tolerated.

Many engineers have been amazed at Randall performance on jobs that had previously given them trouble. Others who have been unable to get their customary bearings have turned to Randalls and discovered thoroughly satisfactory operation with sometimes actual improvement, at much lower cost. Randall's background includes over a third of a century of engineering experience.

RANDALL BEARINGS HAVE BEEN INSTALLED ON ALMOST EVERY TYPE OF WAR PRODUCTION EQUIPMENT

Perhaps *you* can speed *your* war production with these reliable bearings. Write for catalog or full information about any bearing difficulty you may be having.

REPRESENTATIVES

C. W. Marwedel
San Francisco, Cal.

Salt Lake Hardware Co.
Salt Lake City, Utah

Edward D. Maltby Co.
Los Angeles, Cal.

Tek Bearing Co.
177 LaFayette, New York City
1192 Commonwealth Ave., Boston, Mass.

RANDALL GRAPHITE PRODUCTS CORPORATION

DEPT. 911 — 609 W. LAKE ST. — CHICAGO, ILL.

IT'S A LONG WAY..

from RAW STEEL *to the* BATTLE LINES!

But Ryerson Cuts the Corners

IT'S a long way from raw steel to finished tools of war—from plates, structurals, bars and sheets—to planes, tanks, ships and guns! Helping to keep steel moving quickly and smoothly to all of the thousands of operations that must come *ahead* of final assembly is Ryerson's part in the war production job.

Ten big Ryerson Steel-Service Plants, conveniently located to serve the nation, provide a reliable source for emergency steel — quickly available to keep arteries of war production flowing. This is the vital function these steel warehouses are performing.

And, in spite of today's emergencies, when required stocks are not always immediately available, Ryerson engineers, laboratory technicians, and steel-service men usually find a way to supply industry's war needs. Time and again, Ryerson stocks and Ryerson ingenuity, have been able to supply steel vital to the steady flow of war production when at first it seemed impossible.

Whatever your steel requirements — in line with the WPB system—the experience and resources of this century-young steel-service organization are yours to command. Phone, wire or write to the nearest Ryerson plant. You'll get quick action at once. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON STEEL-SERVICE

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES & SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 111, No. 9 — September, 1942 — Founded 1880

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In This Issue

As this issue goes to press warm air heating contractors find themselves facing one of the toughest assignments yet meted out to any industry.

We are expected, in fact required, to keep 10 million American furnaces operating at high efficiency (page 21); despite a currently expected concentration order (page 22), which reduces the number of new furnaces we may have for replacement; we must convert many oil furnaces to burn coal (page 40); yet we face an ever growing scarcity of sheets (pages 30, 32, 44); and the burden of control regulation is increasing every week (pages 24, 27, 32).

◆

The assignment is not impossible—we can apply the ingenuity and knowledge we have been building up in our shops and our research laboratories during the last 20 years, but the job would certainly be a whole lot easier if we all could feel that Washington was trying its best to help us and was not searching for more and more hinderences to apply.

For the duration of the war, it now appears that warm air heating dealers can no longer sell new furnaces or forced air as the cure-all for heating toubles—quite the contrary, we now will have to make existing installations survive so that home owners will not be cold this winter.

◆

Without any doubt, the trade papers should now bend every effort to help their readers. For our part, we begin in this issue a grouping of articles (pages 37 to 43) under the heading "Keep 'em Heating," which month by month will review the scientific data needed to keep 10 million furnaces operating.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

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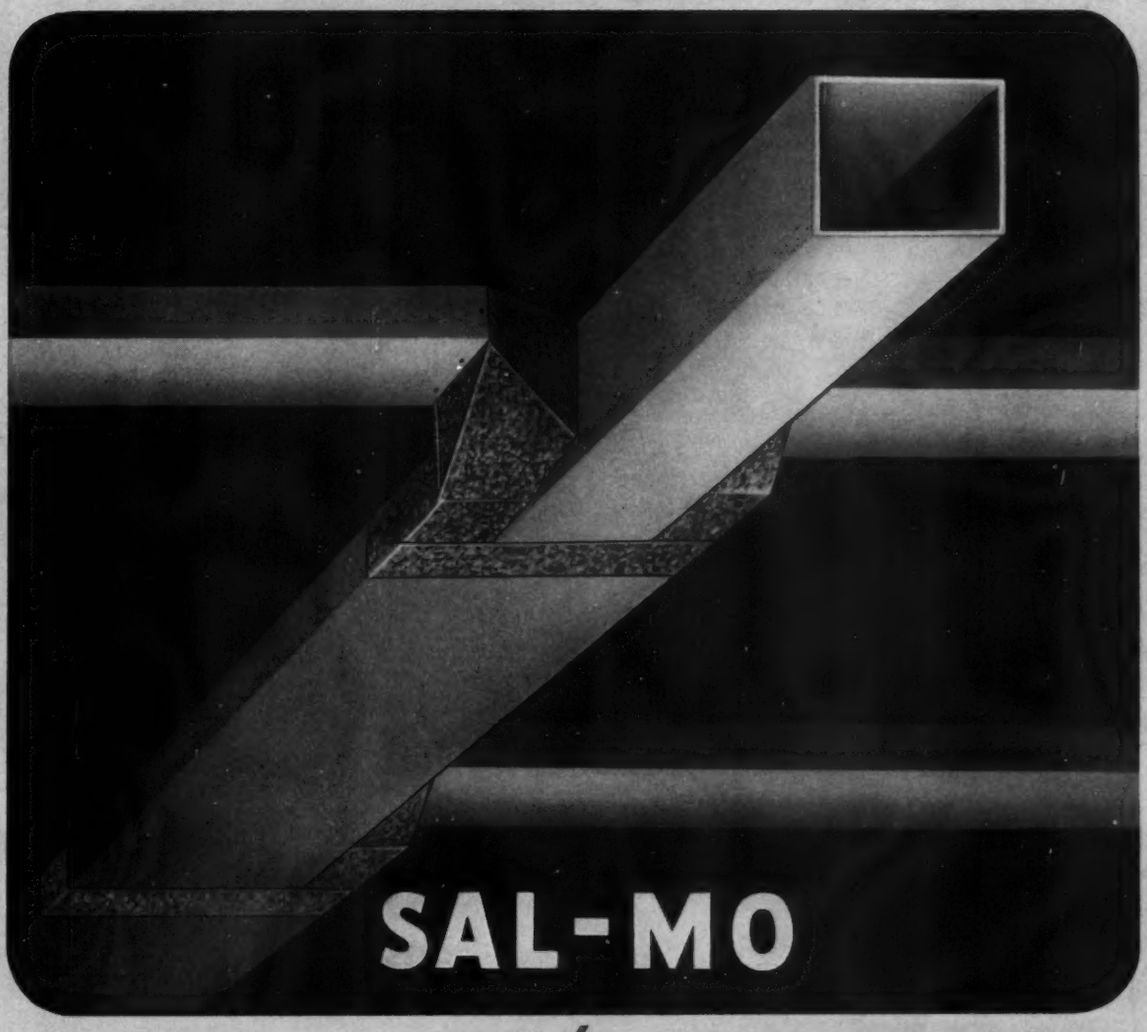

NEW *Prefabricated and Packaged* SUPPLY DUCT

Sal-Mo Supply Duct is a new, non-metallic, strong, durable material for constructing supply and return lines in warm air heating and air conditioning systems.

Only about 10% of the total material in a typical Sal-Mo Supply Duct Installation is metal. And this metal is in the form of standard fittings.

No special skill, tools and equipment, cementing or sealing are required to erect Sal-Mo Supply Duct. It is readily cut with saw or knife. The ease with which it is handled assures greater speed and an appreciable reduction in installation cost.

Sal-Mo Supply Duct has been checked and approved by rated, independent laboratories and authorities, and is known to possess a large margin of safety. Duct systems of this new material are tight, quiet, insulated, and they save fuel.

Sal-Mo Supply Duct is a new basic material for safe, permanent installations . . . and it represents a real saving in critical metals.

Not only is Sal-Mo Supply Duct available in unlimited quantities, but it is furnished in a complete range of sizes for any domestic or industrial requirements.

PATENTS PENDING

SEE YOUR JOBBER OR WRITE

SALL MOUNTAIN COMPANY

176 West Adams Street • Phone ANDover 2414 • Chicago, Illinois

MUELLER Operating on a Wartime Program with Long-range Objectives . . . to help heating and air-conditioning dealers now and in peacetime competition

Mueller at present is devoting a large part of its facilities to war production and will continue to supply the needs of its customers, subject to government limitations. Mueller engineers are carrying on a program of design and development, without interruption.

The public is going to demand a high heating standard in the house of 194? and for the modernization of existing houses — make no mistake about that.

To meet this new standard you must be prepared to deliver a first-class heating job. Here is where the public acceptance of the Mueller name — built up through 85 years of satisfactory performance — and the advantages of the Mueller line will be of real help to you.

Mueller dealers everywhere have been enjoying the advantage of the Mueller reputation and their line of heating equipment. For years, Mueller has concentrated its engineering facilities upon the development of compact, goodlooking heating units to meet the specifications for maximum efficiency. Such units, even for the smallest homes, are practical and proven through usage.

Look to Mueller for continued advances. Install Mueller furnaces on priority work — use genuine Mueller repair parts in your maintenance jobs. Keep in touch with your nearest Mueller distributor for latest information. *L. J. Mueller Furnace Company, 2010 West Oklahoma Avenue, Milwaukee, Wisconsin.*

D-24

★ ★ ★

BUY WAR BONDS

— save for the future and help the war effort NOW!

DESIGNED FOR GAS. Mueller winter air conditioner, completely automatic.

MUELLER

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HEATING AND AIR CONDITIONING

DESIGNED FOR COAL. Mueller winter air conditioner. Compact. Neat. Thermostatically controlled.

DESIGNED FOR OIL. Mueller winter air conditioner, completely automatic.

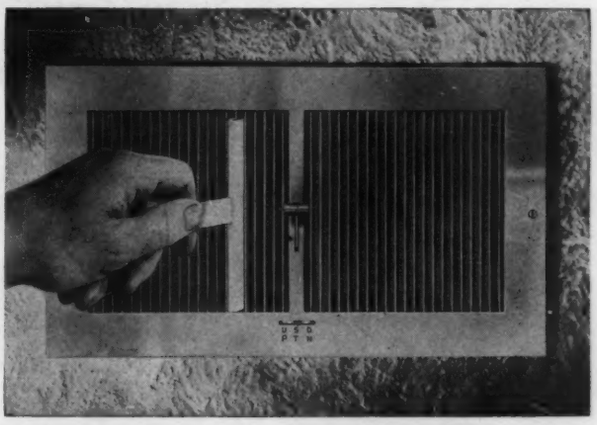
H&C

Streamlined for Supplying Warhousing Register Requirements

Here is the combination of factors that makes H & C, by long odds, your most advantageous source of registers for all war housing requirements:

1. Registers ideally suited to every type of installation.
2. Highest quality and finest design known to the trade.
3. Large stocks of standard items—ready for immediate shipment.
4. The kind of cooperation that COUNTS; backed by unmatched facilities for research and manufacture.
5. Competitive prices.
6. Quotations and data desired furnished PROMPTLY!

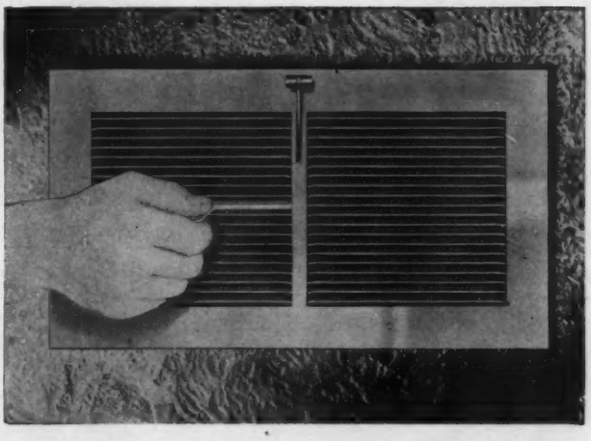
Let this winning combination assist you in getting more of the available business.



H & C No. 75 DESIGN—THE MULTIPLE DEFLECTION REGISTER WITHOUT AN EQUAL — employs famous H & C TURNING BLADE VALVE

The TURNING BLADE VALVE, an exclusive H & C feature, is the only directional valve which when open extends back the full depth of the duct, smoothly dividing and turning every bit of the air flow with equal velocity to every portion of the register face. The result is less turbulence, less resistance and better distribution to the farthest parts of the room. No. 75 costs no more than the conventional multi-shutter register.

H & C No. 130—PERFECT FOR GRAVITY
and also ideal for converting gravity to air conditioning. Superior at every point of comparison.



H & C No. 74—*the ideal low-cost A.C. register.*
Costs but a few cents more than the cheapest; provides far better results.

For other registers ideally suited to war housing see H&C Catalog No. 42

HART & COOLEY MANUFACTURING CO.
Warm Air Registers · Air Conditioning Grilles · Damper Regulator Sets · Dampers · Chain · Pulleys
HOLLAND H&C MICHIGAN
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Western Representatives: Godfrey Rueger Co., Los Angeles, San Francisco, Portland, Seattle, Salt Lake City, Denver

Service

IS YOUR BRIDGE TO FUTURE PROFIT

All you ever heard or read about the importance of service, goes double now!

Service is not only important—it's a vital necessity. And not for the heating industry only—for *all* industry—*for the whole nation!*

In the heating industry we've got a special job to do—the job of conserving . . . protecting what we have. We've got to save existing equipment . . . make it do . . . and see that it serves efficiently and economically—to protect health and morale—*to save fuel!*

There's no time to dream now about the post-war world. But you can do a little hard thinking. And it doesn't take much imagination to picture the market—the pent-up demand—that will exist then.

Service is your bridge to that market—those future profits. It's a worth-while job right now—it will pay off richly when the war is won.

Penn offers you full co-operation in keeping existing heating plants functioning efficiently. Like all items of equipment, automatic controls must be skilfully and thriftily serviced. Under established priority rules Penn is prepared to furnish new controls to replace those which cannot be made to function efficiently. ***Penn Electric Switch Co., Goshen, Ind.***

PENN CONTROLS

REFRIGERATION, AIR CONDITIONING, ENGINE, HEATING, PUMPING AND AIR COMPRESSOR

It checks with the need of today for

heating war workers' homes

Notice the large coal firing opening, unusually capacious for a unit this size. The easy grate operation is also shown.

- Burns anthracite or bituminous
- Hand-fired operation
- Ready for quick shipment
- Speedy installation
  (One-piece unit with clip on jacket)
- Fitzgibbons welded steel construction
- Designed to government specifications
  and
- Built to FITZGIBBONS standards

The

FITZGIBBONS

80 FWA WARM AIR CONDITIONER

Get complete data on this unit — the coupon brings the bulletin.

AA-9

Fitzgibbons Boiler Company, Inc.

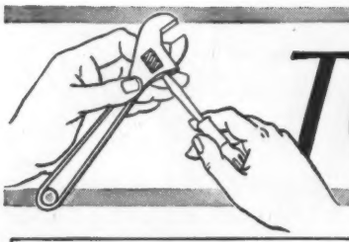
101 PARK AVENUE, NEW YORK, N. Y.

Send me the bulletin about the Fitzgibbons 80 FWA.

Name.....

Address.....

City and State.....



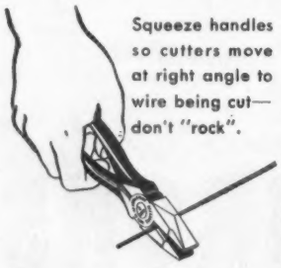
TOOL NOTES

Maintenance and Repair Suggestions to Prolong Tool Life

No. 4 THE USE AND CARE OF CRESCENT CUTTING PLIERS . . .

Crescent *Cutting* Pliers are made in several types to designs which are now pretty well standardized. Since the service for which these tools are intended varies, it is necessary to classify the different types somewhat in discussing their care.

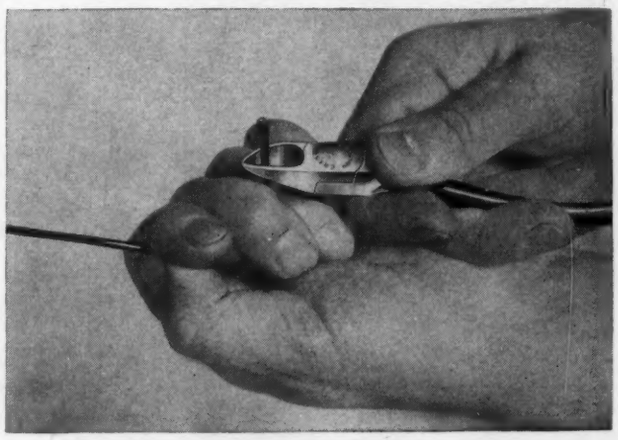
"SIDE CUTTERS". This term is applied to the widely-used lineman's or electrician's type which combines a *gripping* and *cutting* tool. Design is such that the blades of the side-cutters meet, yet the gripping jaws are still open a few thousandths. Such design insures clean cutting of fine silk wire insulation. Chief precaution in using this type is to avoid any "rocking" or "prying" action in cutting thru tough material (see sketch). Don't, of course, hammer the handles or squeeze them in a vise—use a larger and heavier plier. All pliers are *hand* tools and are designed to withstand leverages resulting from the grip of the human hand. Don't expect a "side-cutter" to do the work of a "bolt-clipper"!

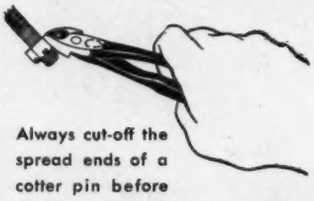


Squeeze handles so cutters move at right angle to wire being cut—don't "rock".

"LIGHT DIAGONALS". These are strictly a "cutting" plier and are used extensively by telephone and radio men, who work with the lighter gauges of insulated wire. Designed for cutting, skinning and "cleaning", they are not intended for heavy work. Large illustration above shows one of these tools being used to "skin" telephone wire.

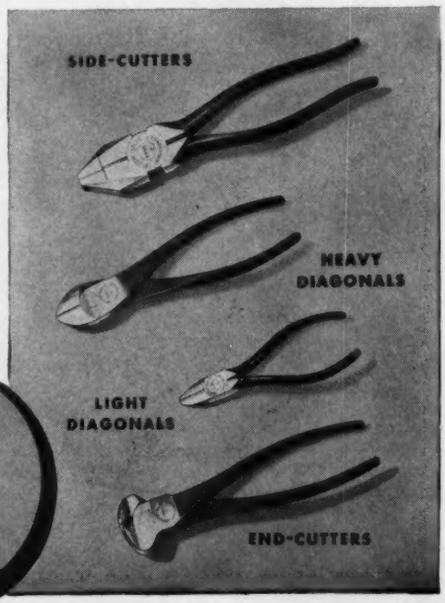
"HEAVY DIAGONALS". Basically the same type as "Light Diagonals" but of heavier construction and therefore may be used in a manner that would constitute abuse of the lighter type. When Heavy Diagonals are used for removing cotter pins, the "spread" ends of the pin must first be cut off. Prying the pin out without first doing this may damage the tool, and is definitely poor practice. After cutting the spread ends, the head of the cotter pin is then gripped and lifted out, as shown in sketch.





Always cut-off the spread ends of a cotter pin before removal with diagonal pliers.

"END CUTTERS". Also called "nippers", characteristically have a generous leverage ratio and therefore are powerful cutters. Their advantage is ability to cut close to flat surfaces. The larger and heavier patterns afford a versatile tool capable of withstanding considerable prying action. For example, a common and permissible use is withdrawing "headless" nails and pulling *finish* and *casing* nails thru trim lumber. Carpenters use this method frequently in remodeling work when "cleaning-up" old casings.



CRESCENT TOOLS
Give Wings to Work

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

The Light of EXPERIENCE

Do you remember the old saying, "Experience is the best teacher"? It applies to every walk of life but nowhere, perhaps, with greater force and truth than in business. Here, in spite of the new and perplexing problems which daily confront all of us, our past work stands forth like a light guiding us on the road ahead.

You, for instance, will continue to command the respect and confidence of your trade because your customers know that over a period of normal, peace-time years, you gave them intelligent, honest service. In the same way we, at OSBORN'S, are proud of our 83-year record of working with and serving the sheet metal industry.

Today, you and we are applying our experience to the most important job we have ever faced . . . that of helping our nation win the war. When the final shot is fired and victory is ours, we will both be able to look back with the satisfaction which comes from a job well done—and we will have gained much new and never-to-be-forgotten experience.

THE J. M. & L. A.
OSBORN Co
CLEVELAND, OHIO
BUFFALO • CINCINNATI • DETROIT
Manufacturers—Distributors of Metals and Metal Products

PRIME METAL SHEETS
EAVES TROUGH, CONDUCTOR PIPE, ETC.
ROOFINGS, NAILS AND PAINTS
FURNACES AND ACCESSORIES
SHEET METAL TOOLS
AND MACHINERY

A DEPENDABLE SOURCE OF SUPPLY FOR 83 YEARS

ENGINEERS WIN THE BATTLE OF INK!

How AIR-MAZE serves the pressroom of Syracuse POST-STANDARD

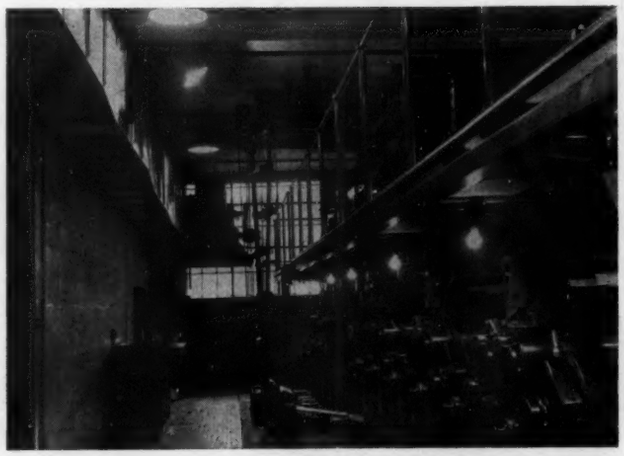
"Keep 'em flying" is not an appropriate slogan for ink particles, is the opinion of Syracuse (N. Y.) Post-Standard officials.

This well known newspaper, in installing an exhaust ventilating system to safeguard the health and working comfort of its pressroom employees, had to take into account flying particles of ink from the presses.

If allowed to collect in the duct work or on the blades and housing of the fan, this flying ink would represent a difficult and expensive cleaning problem. More important, still, solidified ink on the inside of the duct work might constitute a serious fire hazard.

AIR-MAZE engineers, called in to meet this situation, recommended AIR-MAZE Ink-Stop filters placed at eight equally spaced points in the duct work so that the ink could be collected and easily removed. In continuous operation since the summer of 1940, these AIR-MAZE filters keep the air of the pressroom free from ink—in all that time no traces of ink have been found in the duct work or on the fan!

This is only one of the countless successful applications of AIR-MAZE filters to the varied air filtration problems of industry. If you have a troublesome problem, write us today, giving details. We'll be glad to make a study and submit our recommendations, without obligation.



Pressroom of the Syracuse Post-Standard. Ink-Stop filters are located in the ductwork shown in the upper left.

AIR-MAZE CORPORATION, 5130 Harvard Avenue, Cleveland, Ohio

AIR-MAZE

DEPENDABLE AIR FILTERS FOR EVERY APPLICATION

Call Scully for

NATIONAL EMERGENCY ALLOY STEELS

TO save critical materials such as nickel and chromium, "National Emergency Alloy Steels" have been developed as substitutes for the old style alloy steels. These new alloy steels cover a wide range of properties and were especially designed to meet present conditions. Many of them are actually out-performing the steels previously used.

Our stock of these "National Emergency Alloy Steels" is now coming in. We welcome your inquiries and orders and would be happy to assist you in determining the grades best suited to your needs.

Telephone, wire or write the Scully Warehouse nearest you—see phone and teletype numbers above.

Do you lack steel to complete a rush war job? Is your production in danger of being slowed down or stopped for want of some piece of steel or steel product? Then call the nearest Scully warehouse. Many such calls have kept wheels turning. If we don't have what you need, you can be sure that we'll do everything possible to help you get it.

Our first job, like yours, is to speed war production. Every one of our warehouses is on the job day and night. And although our stocks of steel are not what we wish they were, what we have can be yours in a hurry—subject, of course, to priority restrictions. So try Scully—note our phone and teletype numbers above.

Scully Service

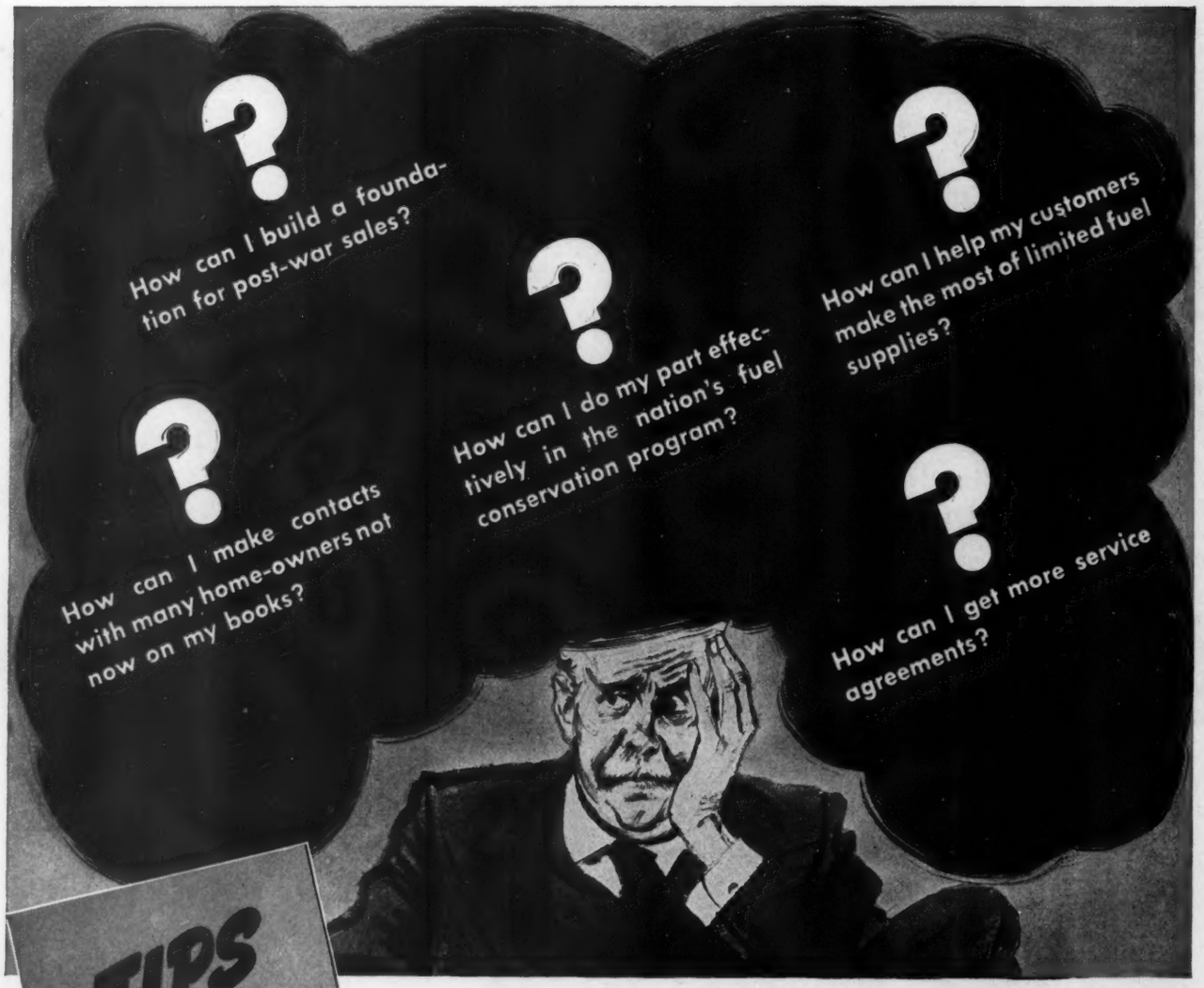
USS

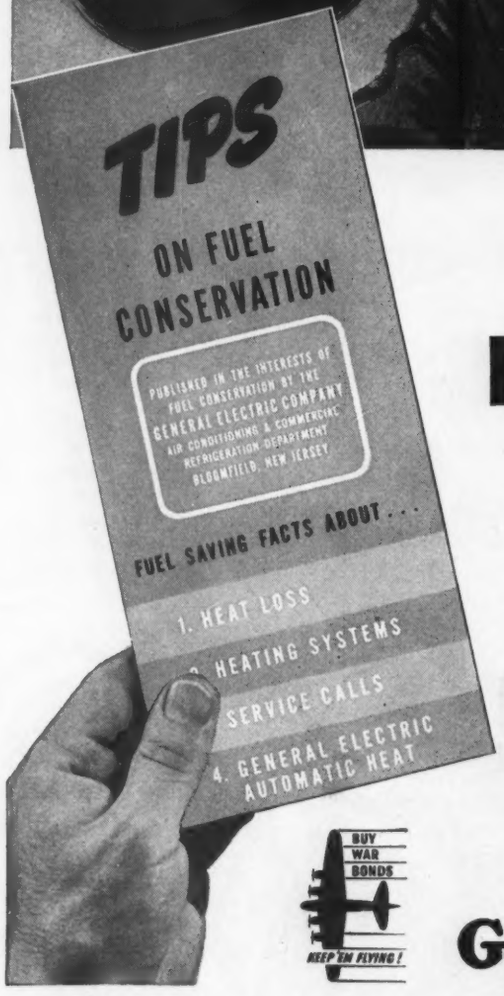
SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel and Steel Products

Warehouses at CHICAGO · NEWARK, N. J. · ST. LOUIS · BOSTON
ST. PAUL-MINNEAPOLIS · CLEVELAND · PITTSBURGH · BALTIMORE

UNITED STATES STEEL


How can I build a foundation for post-war sales?
How can I help my customers make the most of limited fuel supplies?
How can I do my part effectively in the nation's fuel conservation program?
How can I make contacts with many home-owners not now on my books?
How can I get more service agreements?


TIPS
ON FUEL CONSERVATION
PUBLISHED IN THE INTERESTS OF FUEL CONSERVATION BY THE GENERAL ELECTRIC COMPANY AIR CONDITIONING & COMMERCIAL REFRIGERATION DEPARTMENT BLOOMFIELD, NEW JERSEY
FUEL SAVING FACTS ABOUT . . .
1. HEAT LOSS
HEATING SYSTEMS
SERVICE CALLS
4. GENERAL ELECTRIC AUTOMATIC HEAT

THE ANSWERS FOR G-E DEALERS

—just off the press!!

Copies of this timely booklet are now ready for distribution. It is designed to help you maintain happy relations with present customers and future prospects in your territory. It is a valuable guide for home-owners regardless of the type of furnace they own or the fuel they use. Write to your local G-E Heating Distributor, or direct to this division, for your sample copy.

"Tips on Fuel Conservation" is one example of how General Electric aims to protect its dealers and its goodwill with the public. Continuing national advertising in consumer "home" magazines is another. General Electric Co., Automatic Heating Division 2539, Bloomfield, New Jersey.

GENERAL ELECTRIC

COMING UP!

AMERICAN ARTISAN'S 11TH ANNUAL DIRECTORY NUMBER

FOR the eleventh successive year, AMERICAN ARTISAN presents its ANNUAL JANUARY DIRECTORY NUMBER of Residential Air Conditioning, Warm Air Heating, and Sheet Metal Equipment.

This complete, original and authoritative directory will inform present as well as future buyers, what you make, where it is made and the trade name of all your products. It presents a glorious opportunity to offer your lines—to the dealers and contractors who have proved their ability to stay in business . . . who will digest its splendid editorial contents and then file it for reference for the balance of the year. Yes indeed, your advertisement appearing in this greater-than-ever January Directory Number of The AMERICAN ARTISAN will serve a threefold purpose. First, it will place your name and products before the leading high priority buyers in the industry. Second, it will keep your dealers advised of your activities. Third, it will serve as an excellent media to preserve your trademark in the eyes of the trade for the year to come.

Advertisingly, this January issue, selling at regular issue prices, represents an outstanding value.

Don't miss this great opportunity to perpetuate your trade-names . . . to reach the Jobbers and Dealers who handle and will handle your products. Use full advertising space to do your lines justice . . .

Send your Reservation NOW!

AMERICAN ARTISAN

6 NORTH MICHIGAN AVENUE CHICAGO, ILLINOIS

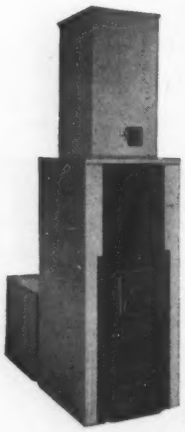
MONCRIEF

HELPING WHERE HELP IS MOST NEEDED

★ ★ ★

Not long ago Moncrief was supplying dealers with the most complete line of furnaces and winter air conditioners, quality made and beautifully styled.

Today, our facilities are needed to help put a stop to the aggressions of Hitler, Hirohito & Co. But we still can supply units on priorities for defense houses and parts for existing Moncrief units.



No. 16 Cast Forced Air Furnace

And when peace comes, dealers can again turn to Moncrief, confident of finding all that is best in warm air furnaces and winter air conditioners, backed by a policy of fair dealing that will help them to build substantially for the future.

Moncrief Furnaces for replacements and Moncrief repair parts are available to Moncrief dealers.

Series C Cast Furnaces

The Henry Furnace & Foundry Co.

3473 E. 49th STREET • CLEVELAND, OHIO

MANUFACTURER OF

MONCRIEF FURNACES AND WINTER AIR CONDITIONERS

Look to

CENTURY MOTORS

For Quiet-Starting and Quiet-Operating Power for Unit Heaters, Air Conditioning Fans and Blowers

War Plant Expansion Opens Big Priority Markets for You

★ Whether you buy, manufacture, sell, or install motor driven heating or ventilating equipment, it's to your advantage to be sure that the electric motor drive accurately meets the demands of every job.

The specialized demands of unit heaters, ventilating and air conditioning fans and blowers present an opportunity for better performance through the selection of motors designed for these specialized jobs.

To meet these conditions, Century Motors offer you a wide range of types and sizes, fractional and integral horsepower.

Today's enormous expansion of war production provides contractors with a vast market for priority business of this type—and on war contracts you'll find shipments of Century Motors especially satisfactory right now.

We invite you to bring your motor problems to Century — your nearest Century Sales Engineer is always available for consultation and advice.

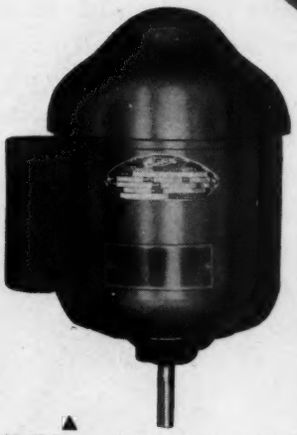
CENTURY ELECTRIC CO., 1806 Pine Street, St. Louis, Missouri

Offices and Stock Points in Principal Cities

Century MOTORS

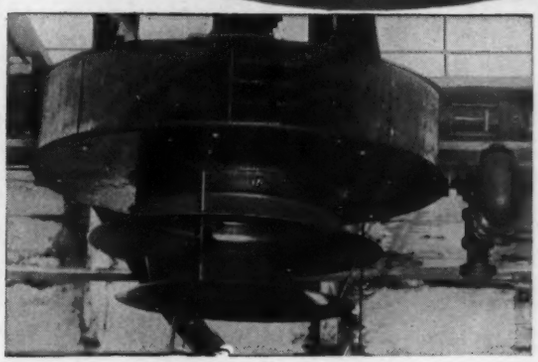
One of the Largest Exclusive Motor and Generator Manufacturers in the World

▲ 1/6 H.P. capacitor [illegible] cushion mounted mo[illegible]

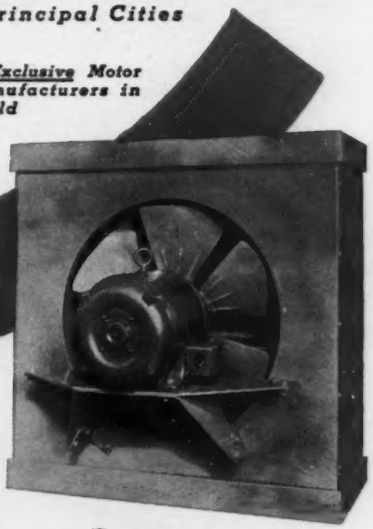


▲ 1/6 H.P. capacitor start vertical ball bearing motor

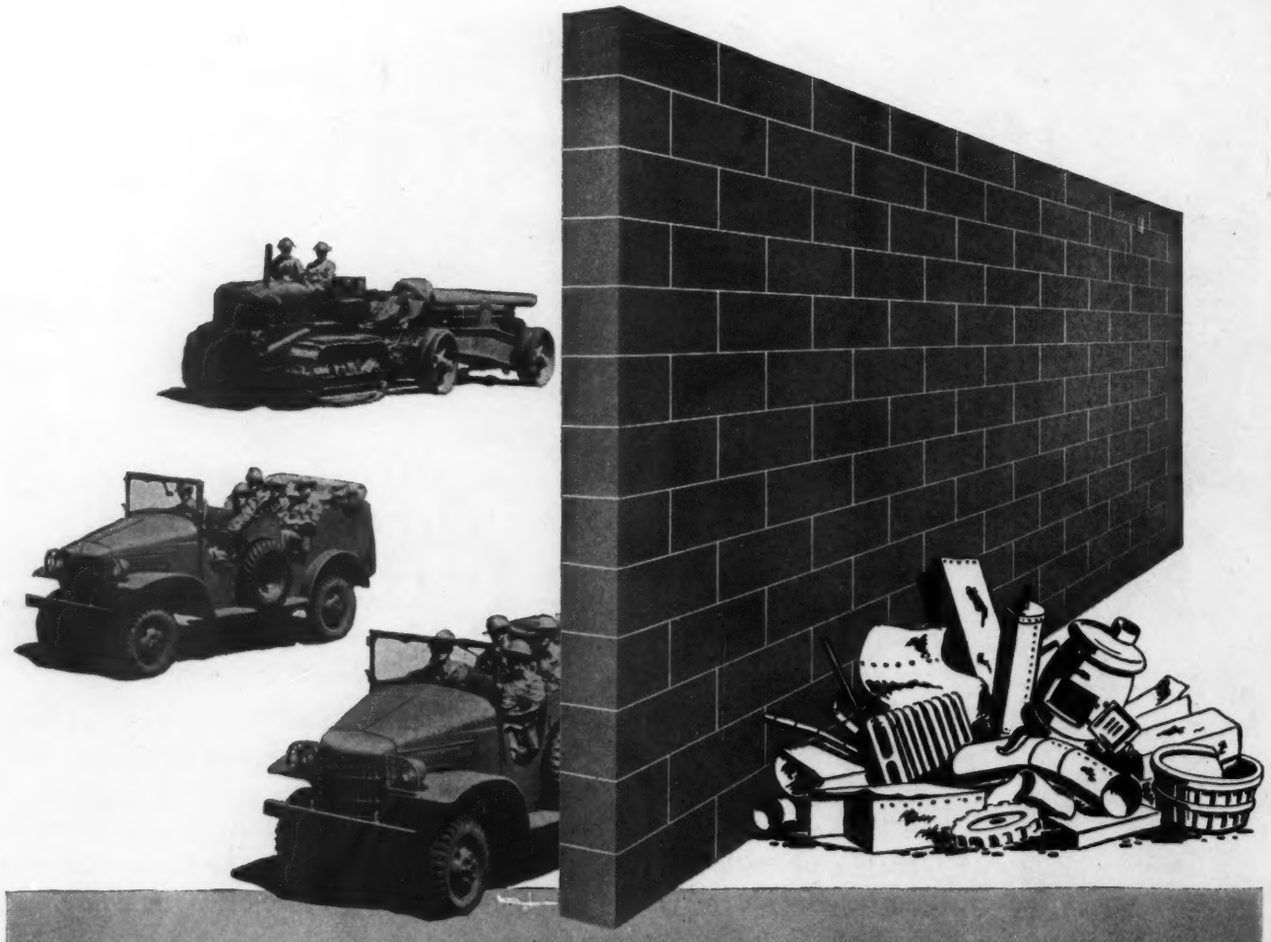
279



1/3 H.P. capacitor start cushion ◀ mounted motor installed in a vertical unit heater



▲ 3/4 H.P. multi-speed totally enclosed 3 phase motor operating a unit heater



IS YOUR SCRAP "HIDING" From Our Fighting Men?

The scrap situation is serious. Waste materials, such as scrap metals and rubber, are desperately needed for our war effort. For example, it takes roughly a half-ton of scrap steel and a half-ton of pig iron to make a ton of new steel for vital fighting equipment.

How Much scrap is needed? Six million tons *more* than can be obtained from regular sources this year. War production will suffer unless these *extra* tons of scrap are collected by December. But it doesn't stop there. The job must go on as long as the war lasts.

All scrap collected will be purchased by the steel industry at government-controlled prices.

Are you set to do your part? Make sure all waste materials are put to work. If you are a contractor, search your shop for old furnace grates and castings, old heating stoves, pipe—even worn-out gutters and downspouts. When you have a large-enough quantity of worn-out equipment and waste metal, call the scrap dealer or your local Salvage Committee. Every pound turned in will help relieve the continuing shortage.

We're all in this together and the only way out is to *get together*. Help speed the scrap collection effort. Do your part for the duration. The American Rolling Mill Company, 2731 Curtis Street, Middletown, Ohio.

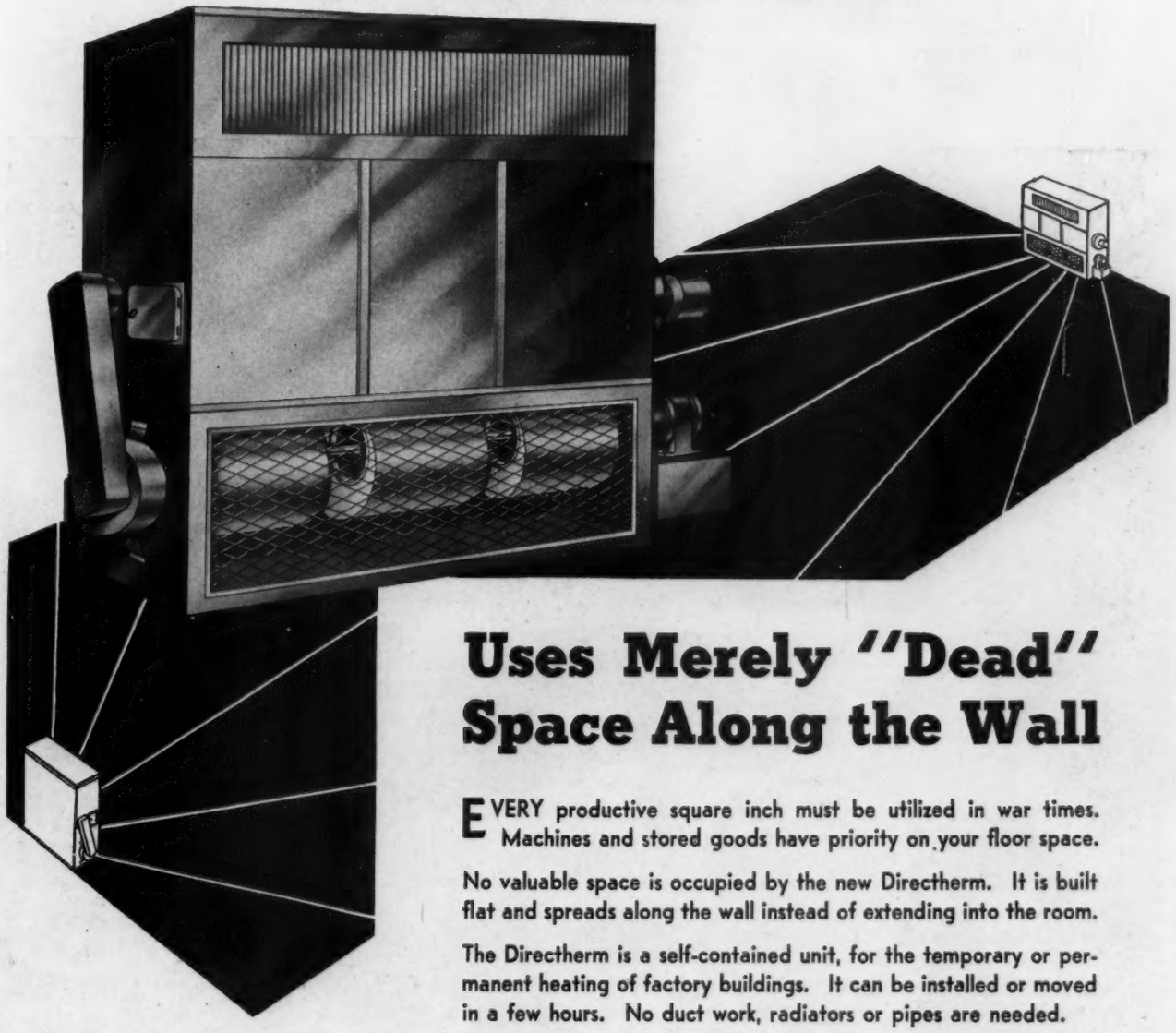
ARMCO

TURN IN ALL YOUR SCRAP

This advertisement is in support of the Salvage Program of the Conservation Division of the War Production Board.

THE NEW DIRECTHERM HEATER

SPACE-SAVER TYPE



Uses Merely "Dead" Space Along the Wall

EVERY productive square inch must be utilized in war times. Machines and stored goods have priority on your floor space.

No valuable space is occupied by the new Directherm. It is built flat and spreads along the wall instead of extending into the room.

The Directherm is a self-contained unit, for the temporary or permanent heating of factory buildings. It can be installed or moved in a few hours. No duct work, radiators or pipes are needed.

Eighty percent of the invested fuel energy is converted to heat, which is cast into the room as far away as 200 feet. That is economy!

For oil or gas fuel. Made in 3 standard sizes (750,000-1,700,000 BTU). Standard Directherm Heaters in 6 sizes (300,000-1,700,000 BTU) for coal, oil or gas fuel.

AIRTHERM
MANUFACTURING COMPANY
706 S. SPRING AVE. · ST. LOUIS, MO.

1,000,000 PEOPLE WILL SEE "YOU" IN TIME OCTOBER 19th

Even though copper for residential sheet metal work is not at this time available, your services during these trying times can be invaluable to many home owners. In this four-color advertisement appearing in Time, October 19th, more than a million readers, the majority of them home owners, will find out how you can help them not only now, but also in the peace time future with your knowledge and skill in the use of durable non-rust copper sheet metal. 4238

One man you ought to keep in mind
You may not even know him—but
the roof of your home is flashed
enduring copper, if you have
per gutters and downspouts that
never rust, his craftsmanship and
owledge were largely responsible.
is a "sheet metal worker" and
A-1 artisan.
Today, the basic, long-lasting metal
of his trade—copper—is needed for
war production. He realizes its im-
portance in helping America win.
Huge quantities are re-
quired for ammunition,
for planes and tanks and
ships, and for the electrifi-
cation of our war-essential
industries.
But though he can't in-
stall for anyone a new rust-
proof copper gutter to replace one
made of less durable material—this
he can do for you. He can patch rust-
able metal work, can re-install tem-
porary materials. He can straighten
the dent in that durable copper gutter
which was damaged when the limb
blew off the tree by the porch. He
can fix that potential leak at the edge
of the flashing around the chimney,
which was exposed when the slates
slipped off. He can prevent small
troubles developing into
large—his inspection and
advice will help you keep
your home more comfort-
able and secure.
Like your building con-
tractor, he is looking for-
ward to the time when
copper will again be available for
everyday use. And he knows that
Anaconda Copper will return—ready
for an even wider range of econom-
ical applications. For Anaconda is
carrying on today the same research
that pioneered such basic contribu-
tions to American living as brass-
pipe plumbing and strong non-rust
bronze screening.
The peacetime future will benefit
directly from the findings of Ana-
conda research throughout this pe-
riod of all-out war activity.
The cherished Navy "E" pennant—awarded to our Bower Connecting plants and Detroit plant for achievement in production.
ANACONDA
Anaconda Copper & Brass
THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

Vol. III

American Artisan

No. 9

With Baling Wire and Chewing Gum, If Needed

ONE of the toughest jobs ever to be handed any American industry has this fall been laid smack in the lap of the warm air heating contractors of this country.

That job, briefly, is to keep ten million warm air furnaces in 10 million American homes in such operating condition that no home owner this coming winter will suffer from the cold.

The job is tough because this industry, by force of circumstances, must keep these 10 million homes owners comfortable despite a curtailment in fuel, despite a curtailment in new furnaces, despite a growing shortage of mechanics, despite an overpowering burden of regulations, despite an acute shortage of practically every product or material we are accustomed to have in abundance.

We believe the industry will meet the emergency.

But the emergency will not be licked by griping. It will not be licked from the seat of our collective pants.

It will be licked only if every member of the industry determines to exercise every ounce of ingenuity and use every bit of knowledge.

Keeping these 10 million furnaces operating will be our contribution to winning the war. And because keeping 10 million home owners comfortable this winter is a patriotic and essential task we can be certain that the agencies in Washington will do everything they can to help us.

It will be a mistake to expect too much. It will be easy to do as little as we can and let Washington do as much as it can.

But because this industry is patriotic; because our sons and our friends are fighting for us; because if we lose this war we have lost everything —let's turn our backs on the easy way. Let's do as much as we can in order that our government has to do as little as possible.

The time is past for questioning why we can't get materials. Anyone with half an eye can see where our tremendous production of materials is going.

And the time is likewise past for belly aching that we are discriminated against. We have not been and we are not now treated any more drastically than a hundred other industries.

If we have half the guts we have always boasted, we can make this job a game.

Sure it would be a feather in our sales cap to sell Mrs. Jones a spick and span new furnace with all the trimmings, but isn't there also some satisfaction in keeping Mrs. Jones' family warm by tieing the old kettle up with baling wire and chewing gum?

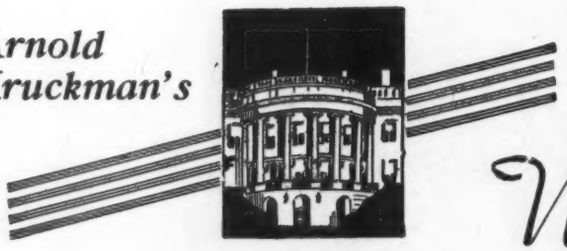
It is easy to tell Mr. Smith—"shovel in more coal, you can get out only the Btu's you put in." But how satisfying it will be if Mr. Smith can keep warm with less coal than he used last winter because we made his heating plant more efficient and made him a better fireman?

And the Brown family—they never have been really comfortable—cold floors, drafts, uneven temperatures. A bigger furnace, a blower, an elaborate control system to anticipate nature's every whim is the thing we'd suggest if we could. But the Brown family will be happy and we'll have that warm glow of accomplishment if by the sale of non-critical insulation and storm windows and a careful balance of the heating system we eliminate those cold floors and drafts and uneven temperatures.

For ten years, now, we've made a fetish of "merchandising." We've been told by sundry experts to become better merchandisers. We've had the automobile, the radio, the refrigerator industries held up as examples of experts in merchandising. We have, in our own right, in these ten years, done a remarkable job of selling the American home owning public better heating, forced

(*Continued on page* 90)

Arnold Kruckman's



Washington Letter

New Furnace Production Regulations

IF each and every one of the thirty odd officials in WPB sign it, Order L-22-a should be public property by the time this appears. In order to make one of these Orders effective it must be approved by all the principal officials of the WPB Plumbing and Heating Branch, by the Priorities people, and by the people in Industry Operations Division, Civilian Supply Division, Labor, Legal, Materials, Purchases, Production, and Administrative Divisions, and usually by the Executive Office of the Chairman. Somewhere along the line also it must pass scrutiny by the Army and Navy people, either directly or indirectly. These approvals are not merely confined to one person in a given Division, they often must be given by several.

All this is important because it is a part of the machine that will exercise supervision and control over your business in the years ahead. It has a bearing on the main theme of this discussion because the impending Order L-22-a is the charter of a complete revolution in the whole foundation of your system of doing business. It not only makes a drastic reduction in what you may produce, and how many furnaces you may produce, and what you may use to make furnaces, but it will lay down the pattern which will determine whether or not your business may continue as a producer of heating equipment.

Further Cut in Furnace Production

At this writing it appears certain all manufacture of warm air furnaces will be restricted to cast iron. Although the WPB Plumbing and Heating Branch people urged that the industry be permitted to produce 160,000 new furnaces it may be the number will be held down to 90,000. This brings prospective production down to 1/6th of normal by volume, and it is generally assumed the furnaces will be reduced at least 20% in weight, in addition to restrictions already in force.

Gray iron already is under allocation, and there is every reason to feel that there will be far greater restrictions before the supply is more abundant. Without official confirmation it seems reasonable to assume that the future allocation of gray iron for the industry will total somewhere between 25,000 and 40,000 tons, with the probabilities tending more towards the lesser tonnage.

Apparently the general idea is to allocate proportional quantities of metal to the manufacturers who will be permitted to continue to produce. Those who manufacture will then carry on broadly along the general lines defined in the original Order L-22 which placed in Class A those factories which produced more than 8,000 furnaces in 1940, and placed in Class B those which produced less than 8,000. You will recall Class A manufacturers were held down to 50% of production in 1940, while Class B were restricted to 90%.

Manufacturers Can Make Own Models

Generally speaking, subject to some undefined modifications, manufacturers who are permitted to produce will have latitude in the type of furnaces they make, always remembering that the drastic cut in metal will presuppose that all gingerbread, and all parts not absolutely essential, will be eliminated. Obviously no one will produce furnaces that cannot be sold. The market will be in furnaces sold to the agencies building shelters for War workers, for agricultural workers in new areas, for War and Navy structures, for the many plants used for War production, for Lend-Lease needs, and for replacements and repairs.

"Victory" Furnace Asked by FHA

The potential Order may not define a Victory model furnace. The Victory model is regarded as the special baby of the Federal Housing Administration and similar War housing agencies. FHA, and probably others, apparently will agree upon a simple model not to exceed 60,000 btu capacity. There will in all likelihood be not more than one model, at any rate not more than two. It will have a firepot measuring not more than 22 inches. If there is a second Victory model it will probably have a firepot of 20 inches. Unofficially, the Victory model furnaces may be rated by the industry at different combustion rates. The equations which have been used in various discussions are 4½ pounds per hour and 7½ pounds per hour.

Incidentally, small 5, 6, or 7 room War worker dwellings, financed by Government with the $600,000,000 recently provided, seem to be vanishing from current plans. Dormitories are becoming more popular among the planners in Washington, due, probably, to their popularity among the workers. The trimmings of social conveniences have caught workers' fancy. It is planned the dormitories shall be equipped with warm air heating systems, one or more furnaces a dormitory, furnaces to range up to 1 million Btu capacity.

It is reiterated here constantly that production of large furnaces is unnecessary because there are enough in stock. All discussions focus on small furnaces. You hear every where urgent suggestion that the chimney furnace be used in small units. It is popular with WPB because it is said the furnace may

be built with 270 pounds of metal or less, and averages a heat capacity of 30,000 to 60,000 Btu. It serves well, according to FHA and USHA and FPHA experts, the WPB formula of 66 Btu per square foot of floor area.

Under the circumstances now developing increased tightness of fuel and space and equipment and other equations are expected substantially to further limit the present WPB top ceiling of 80,000 Btu in new houses. Coal and wood are considered the chief fuels for the next few years, oil growing steadily scanter despite the huge quantities shipped into the East. A large portion of the oil flowing onto the Atlantic seaboard is to be used for marine shipping.

Half Gravity; Half Forced Air

The estimate in FHA quarters is that half the 90,000 furnaces to be produced will be gravity furnaces and half will be forced warm air furnaces with blowers. It is expected 50% will be used for strictly military structures and the other 50% for essential civilian, tapering off to a fringe of non-essential needs which will chiefly be replacement parts for which iron and steel have been allocated. It is planned that castings shall be standardized, and that the design of the Victory model shall be so standardized that interchangeable parts may be made by all manufacturers. Under the leadership of Chief Daniel H. Butler of the WPB Heating Section in cooperation with the Industry Advisory Committee most of the troublesome problems have been smoothed down. Mr. Butler's candor has been very helpful to those who have been obliged to struggle with aspects that seemed full of irreconcilable aspects. Who will finally be permitted to manufacture the furnaces is still unsettled.

Manufacturers to Be "Concentrated"

It has been suggested that production should be "concentrated" or "telescoped" into 5 major firms, or 12 medium manufacturers, or 18 smaller concerns. The predominant view in FHA and in WPB is that the production should be vested in the smaller firms. If this idea prevails it is likely the 30 medium and smaller manufacturers will be designated as the firms to survive. This system would confine larger firms exclusively to the production of War products.

But the Army sincerely believes the smaller firms are not competent to produce furnaces as swiftly as would be possible with the facilities of the large factories. Army, which dominates the program for military production, has bred its experts in the school that has learned techniques and processes in the great factories and plants of the nation. If the Army counsel prevails, it is likely the production will be concentrated in the largest plants.

Six Factors Will Decide Concentration

The "concentration" of the warm air furnace industry also will be determined by 15 criteria. The six major criteria which govern are, of course, first, the supply of critical material, in this case cast iron; second, labor supply, how plentiful it is for the purpose, and whether it is more needed where it is found for purely military production; third, that plant is most useful for production which is nearest to the supply of raw material and labor and other basic elements; fourth, the power factor, which means that it will be carefully considered whether the power or the fuel used making furnaces at a given spot might be used more profitably for the War at that spot for other purposes; fifth, transportation, which is becoming a bottleneck by leaps and bounds. In explanation of the possible transportation problems it is desirable to spread War industries in order to prevent actual jambing of freight cars and trucks, and to prevent a glut of freight in certain centers, either incoming or outgoing, and it is necessary to organize transportation of workers to and from their homes.

The whole problem of transportation is regarded as a problem that will be upon all industrial centers very swiftly early this winter. Some breakdowns are anticipated. To solve part of the problem it has been decided to borrow another idea from Britain, the elimination of the cross-haul. Over there, when tie-ups became desperate after the repeated bombing, they stopped the transport of shipments from one major section to another, and taught the people of the various sections to depend upon their local resources.

The same principle is to be applied here. Only actual War material is to be shipped from section to section. States abutting Philadelphia, Chicago, Omaha, Salt Lake City, Denver, San Francisco, Seattle, will be expected to develop materials for the support of their regions by taking them from their own regions. The breakdown into regions as here given is only offered as typical. In all likelihood the breakdown will be far more local. We must go back, to some extent, to the days of local self-containment.

The sixth of the fifteen criteria—which will all probably be listed in prospective Order L-22-a—is efficiency of management. Obviously the plant, better managed than another, will be chosen to produce furnaces. This doctrine of efficiency of management is the very core of the "concentration" philosophy as it is developing in this country. It hits not only your industry, and all other industries using critical materials, but it hits ALL industry. They tell us frankly inefficiently managed plants and businesses, even if they produce things that do not interfere with the War, must go. For they waste labor, power, and transportation, and they waste space.

What Happened to Stove Industry

Your industry is one of the first to be concentrated, or combined, because it uses the most critical of materials. The first actual American guinea pig for the concentration process was the cooking and heating stove industry. It was squeezed together by ukase early in August. Practically half the 245 factories were compelled either to shut down or to convert to complete War work. The others were permitted to manufacture one model of a Victory range. The general principle applied to the problem of who should make ranges and who should not worked roughly this way: Units selling over $2,000,000 a year simply were told they could not make any more ranges but that they must convert wholly to War work; those selling less than $2,000,000 a year located where labor was short were compelled either to convert to War work or to shut down; those selling less than $2,000,000 a year located where labor was plentiful were permitted to manufacture the much stripped lightweight Victory model. It is estimated of the 40,000 persons employed in the industry roughly 25,000 either went into War work or went out of employment. Probably the most of them were re-employed, although a number possibly were compelled to take less remunerative jobs.

(Continued on page 97)

How to use the

Allocation Classification System

[Priorities Regulations 10, 11, 3]

IN the July issue, we published Priorities Regulations 10 and 11 and 3 which set up a simplified system of endorsement (PR-3) and an allocation system (PR-11) under which any user of more than $5,000 worth of metal in a calendar quarter gets his material (sheets) under the Production Requirements Plan.

PR-10 which assigns purchaser symbols to purchases seems to have caused some trouble. PR-10 has been confused with the Priorities system with which PR-10 distinctly has no connection.

Further, some jobbers are insisting that every contractor's order bear a Purchaser's Symbol and refuse to sell the contractor until he has placed a symbol on his order.

This is not necessary. Section (b) of PR-10 says—"Exceptions as to Retail Purchases—The provisions of paragraph (a) hereof shall not be applicable to retail purchases (customer from retailer), purchases by retailers (retailers from jobbers) or purchases by distributors for resale to retailers (jobbers to sales agencies). Industrial and mill suppliers, warehouses and other businesses performing similar functions for industry shall not be deemed retailers for the purposes of this paragraph."

XYZ TRUST COMPANY

Louis E. Drehobl
Chicago, Illinois

Gentlemen:

As per your recent estimate, you are hereby authorized to do the following work.

Our order for this work is No. 879.

Attached is our letter of certification for the two furnaces required in the above order.

Replace 1 firepot at 123 M St.	$ 35.00
Replace 1 set of grates at 234 O St. .	25.00
Replace 1 furnace at 345 A Ave. . . .	180.00
Replace 1 furnace at 456 B St.	234.00
Repair gutter at 567 R St.	26.00
Replace gutter and downspouts a 23 C St.	42.00

All work to be done in a workmanlike manner and to be completed in the next 60 days.

Yours truly,

August 1, 1942 XYZ TRUST COMPANY

The owner's order may be a letter like the above or an order form. Note the furnaces to be replaced and the other repairs needed are specified by job location.

This means that a furnace dealer need not show any Purchaser Symbol (DP, USA, USN, LL, FP) nor any Allocation Classification Symbol (21.10, 21.20, etc.) on his order to the jobber unless the dealer gets a symbol from his customer; in this case it is all right to extend the symbol to the jobber.

The furnace or sheet jobber, however, does show on his order to his manufacturer the Purchaser Symbol (probably DP, Domestic Purchasers) on all orders and in new house work the Allocation Classification Symbol (21.10, 21.20, etc.) on all orders.

To illustrate how an order "flows" from a home owner to the original producer we have secured from Louis E. Drehobl, Chicago furnace dealer; from Ray Lorenz of Chicago Furnace Supply Co., Chicago jobber; and from Williamson Heater Co., furnace manufacturer, blank orders, on which we

XYZ TRUST COMPANY

Louis E. Drehobl
Chicago, Illinois

Gentlemen:

On our order of August 1, No. 879, you were authorized to replace one furnace at 345 A Avenue and one furnace at 456 B Street.

This letter certifies that these two furnaces are beyond practicable repair.

The units being removed are:

At 345 A Ave. - Simplex Model A, 24-inch
Serial No. 466
Parts worn out are: firepot, combustion chamber, bottom casing ring, ash pit door, firing door frame.

You will replace with a Williamson Heater Co. Furnace No. 041-24B, rated 582 inches of leader pipe.

At 456 B St. - Simplex Model A-1, 26-inch,
Serial No. 1061
Parts worn out are: grates, both firepot sections, firing door frame, ash pit door frame, two cold air boots.

You will replace with a Williamson Heater Co. Furnace No. 041-26B, rated 696 inches of leader pipe.

Signed - John Smith
Authorized for XYZ Trust Co.

August 1, 1942 _____
(Signature of furnace dealer)

To comply with section g-1, 2, 3 of order P-84, the two furnaces to be replaced are designated by model, address and exactly what parts are worn out. The model, size and make of the new furnaces are given. Note the new furnace is the same size as the old furnace. In case a larger furnace is needed, special permission must be obtained.

CHICAGO, Aug. 3 19 42

ORDERED FROM Chicago Furnace Supply Co

CLERK

	Price Quoted	
For XYZ Trust Co. Replacements at 345 A Ave and 456 B St., Chicago		
Williamson No. 041-24B		
Williamson No. 041-26B		
Firepot section (Corrugated, Light) for P-W No. 53 Favorite		
Material for Emergency Repairs of Plumbing or Heating Equipment - Rating A-10 under Preference Rating Order No. P-84 with terms of which I am familiar		
Signed: Louis E. Dreholl		
Purchasers Symbol DP		

Ordered by L. E. D.

Nº 1843

Contractor Dreholl's order to his jobber for the new furnaces carries model, size, and is certified by the original certification. Purchasers Symbol DP (domestic purchase) is the only symbol required.

have placed an order originating with a trust company for repair work on several houses under the trust's control.

The trust company order might be a letter of authorization as we have used or it might be a formal order form. In either event, note that the work and place are indicated as an order and that in replacement the order is accompanied by a letter giving information required under Preference Rating Order P-84 which says (Section g-1, 2, 3, 4) "In the case of a unit which has been worn out, damaged beyond repair or destroyed, the cost of the unit to the Installer exceeds $50, the Installer shall attach to each copy of the purchase order for a delivery rated hereunder, a statement signed by the ultimate user and by the installer, which statement shall certify that repair of the unit is impracticable and shall specify:

(1) the unit being removed
(2) the part or parts of such unit which failed
(3) the age, model, make, size, and serial number (where available) of such unit or parts
(4) the replacing unit, its model, make, size, and serial number (where available)"

This letter is signed by an authorized agent of the Trust Company. This letter is, in turn, signed by the furnace dealer and accompanies his order to his jobber.

In turn, Chicago Furnace Supply Co. makes out an order to the furnace manufacturer as shown and endorses it with the certification we show on the order.

This is in accordance with the procedure as of

PURCHASE ORDER

CHICAGO FURNACE SUPPLY CO. P.O. Nº 9020

PURCHASING DEPARTMENT
1278-1282 CLYBOURN AVENUE
CHICAGO, ILLINOIS

THIS NO. MUST APPEAR ON INVOICE, B/L, CASES, BUNDLES, PACKING SLIP, AND COMMUNICATIONS.

TELEPHONE MOHAWK 1382

DATE 8/4/42

SHIPPING DATE: At Once
F. O. B.
REF. ALLOWED
QUOTATION
INQUIRY No.
TERMS
MARK FOR

TO Williamson Heater Co
Cincinnati, Ohio

PLEASE SHIP THE FOLLOWING MERCHANDISE SUBJECT TO CONDITIONS BELOW:

SHIP TO Chicago Furnace Supply Co
1278 Clybourn Ave
Chicago, Ill.

VIA Truck

To insure prompt payment mail invoice showing order number and with bill of lading attached, to our office, immediately after shipment is made.
Advise promptly if unable to make immediate shipment.
Please advise receipt and acceptance of this order promptly.
No charges allowed for boxing, crating or packing.
Goods subject to our inspection on arrival, notwithstanding prior payment to obtain cash discount.
Goods rejected on account of inferior quality or workmanship will be returned to you with charge for transportation both ways plus labor reloading, trucking, etc., and are not to be replaced except upon receipt of written instructions from us.

REQUISITION	QUANTITY	DESCRIPTION	PRICE
	1	Williamson Model 041-24B A-10 - DP	
	1	Williamson Model 041-26B A-10 - DP	
	1	Firepot section (Corrugated, Light) for No. 53 P-W Favorite A-10 - DP	

Material for Emergency Repairs of Plumbing and Heating Equipment - Rating A-10 under Preference Rating Order No. P-84 with terms of which I am familiar.

Chicago Furnace Supply Co.

PURCHASING AGENT

PER

Chicago Furnace Supply Company's order to the furnace manufacturer extends the same P-84 certification; also the DP symbol and the A-10 rating permitted by P-84.

July 1. When, as stated in the July issue, Priority Regulation No. 3 simplified this procedure by ordering—"Effective July 1, any preference rating, no matter how it has been assigned, *may be* applied or extended by a single form of certification, which states merely that the purchaser certifies

(*Continued on page* 108)

PURCHASE ORDER

THE WILLIAMSON HEATER CO.

General Office: 930-937-939 W. Fifth St.—Factory: Madison and Marburg Aves., Oakley

DATE August 4 42 TEL. CE 9900 CINCINNATI, OHIO TEL. MI 3000

THIS NUMBER MUST APPEAR ON THIS INVOICE AND ALSO ON ALL PACKAGES.

ORDER NO. 18445
Req. 111

TO Hercules Iron Co.
Birmingham,
Alabama.

SHIP TO The Williamson Heater Co.
Oakley Plant, Track #3.
Cincinnati,
Ohio.

PLEASE ENTER OUR ORDER AS PER SPECIFICATIONS AND CONDITIONS.

QUANTITY	DESCRIPTION	PRICE	AMOUNT	
500 Tons	Southern Foundry Pig Iron	$24.50 per ton Base.		SHIP VIA for R & O Delivery.
	200 Tons A-1-4 Rating)			WHEN September 1942.
	100 Tons A-1-3 Rating) P90-1254 C.			F.O.B. Cincinnati, Ohio.
	200 Tons A-10 Rating)			
	A.I. & S.I. Code H288088			CONDITIONS
	Sil 2.75 to 3.00			Acknowledge receipt of this order and notify Purchasing Department of exact when shipment will be made.
	Sul .050 Max			Include Packing List in each shipment.—Mark "PARTIAL" all shipments which do not complete this order.—Mark last shipment "FINAL".
	Phos .70 to .75			We will not be responsible for goods furnished or services rendered without written orders.
	Mang .75 to 1.00			We allow no packing or cartage charges.
				Bills will be cash discounted on the 10th of the month following, unless otherwise agreed.
				Goods are subject to our inspection, notwithstanding prior payment to obtain cash discount.
				The vendor agrees to protect THE WILLIAMSON HEATER COMPANY and its customers against all claims for patent infringement arising out of the use or sale of the equipment or product specified herein.
				THE WILLIAMSON HEATER CO.
				PER Purchasing Agent

FORM No. 040-30

LET'S RECIPROCATE WE ARE GLAD TO PLACE THIS ORDER WITH YOU. WON'T YOU THINK OF US IN CONNECTION WITH YOUR HEATING NEEDS?

The furnace manufacturer "baskets" his orders carrying the same ratings and translates similar ratings into tonnage as shown on this order.

TO: CHICAGO FURNACE SUPPLY COMPANY
1276 CLYBOURN AVE., CHICAGO, ILL.

DATE Aug. 3, 1942

PLEASE ENTER OUR ORDER FOR THE FOLLOWING MATERIAL:

QUANTITY	SIZE	DESCRIPTION	PRIORITY RATING	ALLOCATION CLASSIFICATION SYMBOL
1	#041-24B	Williamson fce.	A-10	DP-
1	#041-26B	" "	A-10	DP-
1	set firepots for #53 Favorite fce.		A-10	DP-

(For XYZ Trust Company Replacements at 345 A Avenue and 456 B Street, Chicago)

CERTIFICATION. The undersigned purchaser hereby represents to the seller and to the War Production Board that he is entitled to apply or extend the preference ratings indicated opposite the items shown on this purchase order, and that such application or extension is in accordance with Priorities Regulation No. 3 as amended, with the terms of which the undersigned is familiar.

L. Drehoble — Name of Purchaser
4978 Milwaukee Avenue — Address

Signed by Dealer — Signature & Title of Duly Authorized Officer
8-3-42 — Date

Goods for repair and maintenance of homes take Symbol DP ..... You are still privileged to apply A10 ratings on above. Goods for Defense Housing - take symbol DP 21.20. Ratings on above vary, depending on P55 order.

Purchaser is obliged to retain copy of this order in his files for at least two years for inspection by the War Production Board.

Chicago Furnace Supply Co., as a service to its dealers, distributed these mimeographed forms for P-84 orders. This form uses the simplified certification approved under Priority Regulation 3.

◆

Below is another Chicago Furnace Supply form mimeographed for dealers who must obtain the owner's signature for replacement of a furnace. This takes the place of the XYZ Trust Co. letter.

TO: CHICAGO FURNACE SUPPLY COMPANY DATE_____

STATEMENT REQUIRED UNDER PREFERENCE RATING ORDER P-84 FOR REPLACEMENT OF UNIT WHEN COST OF NEW UNIT TO INSTALLER EXCEEDS $50.00.

HOME OWNER_____ INSTALLER_____

ADDRESS_____ ADDRESS_____

(1) NAME OF UNIT BEING REMOVED_____

(2) THE PART OR PARTS OF SUCH UNIT WHICH FAILED_____

(3) APPROXIMATE AGE _____MODEL_____MAKE_____ SIZE_____SERIAL #_____(WHERE AVAILABLE) OF SUCH UNIT OR PARTS

(4) REPLACING UNIT, MODEL #_____MAKE_____ SIZE_____SERIAL #_____(WHERE AVAILABLE)

We hereby certify that repair of the above unit is impracticable.

_____ (HOME OWNER)

_____ (INSTALLER)

ABOVE CERTIFICATE MUST BE SIGNED BY HOME OWNER AND INSTALLER AND SENT TO US WITH PURCHASE ORDER. INSTALLER MUST RETAIN COPY SIGNED BY HOME OWNER IN HIS FILES FOR AT LEAST TWO YEARS.

Stebbins Hardware Company

ESTABLISHED 1860

15 West Van Buren Street

TELEPHONE HARRISON 8400

Chicago, Ill.

Preference Rating

Salesman No. 6 — QUAD OR SINGLE CHARGE NO._____

QUAN.	ITEMS	PRICE	PER	RATING
2#	Galvanized Staples	16¢	lb	A-10

End Use Home — For Repair

CERTIFICATION

The undersigned purchaser hereby represents to the seller and to the War Production Board that he is entitled to apply or extend the preference ratings indicated opposite the items shown on this purchase order, and that such application or extension is in accordance with Priorities Regulation No. 3 as amended, with the terms of which the undersigned is familiar.

J D Wilder — Name of Purchaser
Winfield Ill — Address

By_____ — Signature and Title of Duly Authorized Officer
_____ — Date

The form above is used for all "over-the-counter" sales of critical materials. This actual order indicates how small an order is now being signed for.

◆

Chicago Furnace Supply Co., sent this letter to its dealers to explain the simplified certification and the allocation classification symbols. This proved very helpful.

JULY 21st, 1942

METHOD OF EXTENDING PRIORITIES SIMPLIFIED
(Known as Priorities Regulation No. 3 Amended)

As of July 1st a greatly simplified method of extending priorities became effective, by which all priorities may be extended in one uniform method which is accomplished by simply writing the new certification clause on your orders and indicating the priority rating which applies to each item, opposite the item.

It is no longer necessary to use one endorsement for P84 preference ratings and another for P55 preference ratings, etc. Neither is it necessary for you to send us photostatic copies of P55 preference ratings when you order goods for defense housing.

A very important thing to consider in this regulation is that it places the entire burden upon the purchaser. If you read the certification you will note that the purchaser represents to the seller and to WPB his right to extend the ratings. Therefore, it is of supreme importance that you keep your own records in such shape as to show your right to extend the ratings. If you are extending an A10 rating to obtain materials for furnace repair work you should keep a copy of the order with as much information as possible indicating the particular jobs on which it was used. Also a copy of the certification by the home owner regarding the condition of the furnace that was removed. If you are extending a rating to us to obtain goods for defense housing, you should keep your order, countersigned by FHA, as well as photostatic copies of P55 amended in your own files. For the convenience of our customers as well as expediting the handling of clerical work in our office we are furnishing purchase orders that you can use on which you will note we have imprinted the certification for extension of the rating at the bottom.

PRIORITIES REGULATION NO. 10
ALLOCATION CLASSIFICATION SYMBOL

This additional new regulation demands that wholesalers and dealers indicate on their purchase orders the "end use" for which materials are wanted. In other words WPB demands from the manufacturer and wholesaler information which will show how much goods is going to the Army and Navy, Lend-Lease, Maritime Commission and Domestic Purchasers. There are many categories but the two which effect you and us almost 100% are for goods used for construction of homes which are designated as DP-21.20 (same as P55) and goods that are to be used for repair and maintenance on which you use the symbols DP- (same as P84).

We believe both of the above new rulings are a very constructive move and that a very few minutes study of them will convince you a great amount of time will be saved over the old methods.

CHICAGO FURNACE SUPPLY COMPANY

Priority Regulation No. 13

["Special" Sales of Frozen Inventories]

CRITICAL materials now frozen in idle inventories may be freed for war production by a new order, Priorities Regulation No. 13, which sets up new and uniform rules governing the sale of idle inventories of certain kinds and removes such specified sales from the existing regulations which affect the normal flow of material.

Limitation orders, issued by WPB to conserve scarce materials, contain various provisions which restricted disposal of inventories frozen as a result of their terms. These restrictions are now replaced by the conditions established in the new regulation, which controls all sales of restricted material including those sold in liquidation and bankruptcy proceedings.

Reserved for specified purchasers is "War Material," consisting of some 150 materials listed in Schedule "A" to the Regulation. This material now may be sold to the armed services, Maritime Commission, and certain other Government agencies. In addition, sales of War Material, as defined, may be made to persons who qualify by belonging to a class listed in Schedule "A" as being eligible to receive it.

Applications for specific sales not covered by the general provisions of Regulation No. 13 should be filed on Form PD-470 at the nearest WPB field office.

Sales of less than $100 may be made to anyone.

Materials not listed on Schedule "A," may be purchased by anyone authorized by existing regulations to receive and make specified uses of them. It is pointed out in the new regulation, however, that its terms do not exempt a purchaser from end-use and quota restrictions.

Schedule "A" sets forth the differing conditions under which metals, chemicals, alloys and other restricted commodities may be sold, and to whom.

For example, copper and brass mill and foundry products may be sold without preference ratings to purchasers who produce material in the form it was acquired by the holder; to producers permitted to buy for an authorized use, or orders bearing a preference rating of A-1-k or higher. They may be sold without preference ratings to a wholesale dealer in the material in the form held by the seller, if the dealer has been issued an allocation certificate or other authority to buy. They may not be sold to scrap dealers.

It is emphasized that any purchaser acquiring War Materials as a result of a type of sale authorized by Regulation No. 13 must comply with all inventory, quota, and use restrictions imposed by all other orders and regulations.

(Editor's Note: This is important to us. For example suppose your jobber buys a quantity of sheets which have been frozen. He is not permitted to sell these to you on A-10 for repair because Amendment 6 to M-21-b says a jobber may sell only 5 per cent of his stock on ratings under A-1-a. This illustrates how prevailing orders still control distribution of materials acquired under PR 13.)

The Inventory and requisitioning Branch of WPB will assist the movement of idle materials and production equipment into the war program, under the new regulation, and all queries should be addressed to its representative in the nearest WPB field office.

Special Sales of Idle or Frozen Materials

§ 944.34 Priorities Regulation 13—(a) Purpose. The purpose of this regulation is to provide uniform rules governing special sales of idle or excess materials by persons who are not regularly engaged in the business of selling such materials, including distress and liquidation sales and sales by persons who, by reason of the effect of priority orders or for other reasons, cannot use such materials in the regular course of their business. This regulation does not authorize receipt or use of any material by any person in violation of any inventory, quota or use restrictions imposed by any order or regulation.

(b) Definitions.—For the purposes of this regulation:

(1) "Sale" of a material includes any public or private sale, auction sale, sale upon foreclosure of any lien or mortgage, or delivery of such material in exchange for money or for any other material and the sale of any warehouse receipt, bill of lading or other document evidencing an interest in such material, but does not include the pledge or mortgage or other creation of any lien upon such material or the transfer of possession of such material without any transfer of title.

(2) "Special sale" means any sale except:

(i) A sale of any material in a form regularly sold by the seller in the course of his business; and

(ii) A sale of any tool, machinery, or other assembled commercial, industrial, production, agricultural, or household equipment; and

(iii) A sale of material in the form in which it is used by ultimate consumers thereof without being further processed or assembled with other materials or made a part of any building or structure; and

(iv) A sale of foodstuffs, medicine and other materials for internal human consumption.

"Special sale" also includes any sale made or caused to be made by any receiver, trustee in bankruptcy, public official or any other person acting in a fiduciary or representative capacity, and not in the course of carrying on the business of an insolvent or bankrupt person or other person whose business is in the hands of such fiduciary or representatives.

(3) "Material" means any commodity, equipment, accessory, part, assembly or product of any kind.

(4) "War material" means any material consisting in whole or in substantial part of one or more materials listed in Schedule "A" attached.

(5) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not.

(6) "Producer" means any person who produces, manufactures, fabricates, processes, constructs or assembles any material and includes any person furnishing electric, gas, water, sanitation, steam, transportation, communication or other utility services to the public.

(7) "Director" means the Director of Industry Operations of the War Production Board or the Director of Priorities of the Office of Production Management.

(c) Permitted special sales.—(1) Subject to paragraph (d) of this regulation, any person may make a special sale of any material other than a war material without

restriction.

(2) Subject to pragraph (d) of this regulation, any person may make a special sale of any war material if the sale falls within one of the following categories, and no person may make any special sale of any war material if such sale does not fall within one of the following categories:

(i) A sale to any of the following governmental departments or agencies or to any person buying for the account of such departments or agencies: Maritime Commission, Navy Department, War Department, Board of Economic Warfare, Commodity Credit Corporation, Defense Supplies Corporation, Metals Reserve Company, Rubber Reserve Company and any other corporation organized under Section 5 (d) of the Reconstruction Finance Corporation Act as amended; or

(ii) A sale pursuant to a specific authorization of the Director naming the seller and identifying the particular sale to be made; or

(iii) A sale by a producer to another producer engaged in the same business as the seller, but only if an order of the Director applicable generally to persons engaged in such business expressly permits such a sale; or

(iv) A sale of an individual lot of war material at an aggregate price of less than $100: Provided, That this exception shall not be construed to permit the dividing of holdings of war material into lots having a value of less than $100 and disposing of such lots under this subparagraph (2) (iv); or

(v) A sale to any person falling within a class indicated on Schedule "A" attached as being a class to whom the particular war material may be sold: Provided, That when any alloy, compound, mixture, or product is not listed as such on Schedule "A" and contains a significant amount of more than one war material, the sale shall be made only to a person to whom all such contained war materials may be sold.

(d) Effect on other orders and regulations.—(1) Any sale which is not a special sale shall remain subject to the

SCHEDULE "A"

Explanatory Note

This schedule relates only to special sales made under paragraph (c) (2) (v) of this regulation. Any purchaser of material through a special sale must comply with all inventory, quota, and use restrictions imposed by all other orders and regulations.

When an alloyed material, or a physically or chemically compounded material, is shown in this table, the conditions that govern the sale of the alloyed or compounded material are those shown for the alloy or compound and not those shown for the constituent elements or parts. For example, the conditions under which stainless steel may be sold are those shown for the war material "Stainless Steel" and not those shown for "Chromium" or "Nickel" or "Steel." When any alloy, compound, mixture, or product is not listed as such on Schedule "A" and contains a significant amount of more than one war material, the sale shall be made only to a person to whom all such contained war materials may be sold.

The word "No" appearing in any column in this schedule means that a holder may not sell the particular war material to any person in the class to which that column applies unless the sale is otherwise permitted by this regulation.

The letters "P. R." mean Preference Rating, and wherever they appear in any column, mean that the holder may sell the particular war material to any person in the class to which that column applies, but only provided that such person places with the holder an order for the material bearing a duly applied or extended preference rating equal to or higher than the rating shown immediately after the letters "P. R." For example, P. R. A-1-k," which appears opposite the war material "Nickel" in the column headed "Any producer permitted to buy for an authorized use" means that the holder may sell to any producer who places an order for a product containing nickel if that order bears a duly applied or extended preference rating of A-1-k or higher.

The letters "W. O. P." mean "Without Preference Rating" and wherever they appear in any column mean that the holder may sell the particular material to any person in the class to which that column applies without any preference rating from the buyer.

The letter "X" means "not applicable."

Wherever an asterisk (*) appears, refer to the note in the "Remarks" column.

War material	Classes of buyers to whom special sales of war materials may be made in accordance with this schedule, subject to paragraph (d) (2) of this regulation					Remarks
	Producers as defined in this regulation		Reprocessors who are authorized to buy	Wholesale dealers in the materials in the form held by holder	Scrap dealers who are authorized to buy	
	Producers who produce material in the form in which it was purchased by holder	Other producers permitted to buy for an authorized use				
(1)	(2)	(3)	(4)	(5)	(6)	(7)
PART I—METALS						
Aluminum:						
Aluminum	W. O. P.	No	W. O. P.*	W. O. P.*	No	*Only to approved reprocessors and wholesale dealers. Lists available at WPB offices.
Copper:						
Copper and Brass Foundry Products	W. O. P.	PR A-1-k	X	W. O. P.*	No	*Only to persons holding allocation certificates or specific authorization to buy.
Iron:						
Alloy Iron Castings*	W. O. P.	PR A-1-k	W. O. P.	X	W. O. P.	*Does not include materials commonly known as "ferroalloys," listed in Priorities, Regulation No. 11 as "ferro-alloying agents."
Cast Iron Products	W. O. P.	PR A-9	W. O. P.	W. O. P.	No	
Nickel:						
Nickel (including Monel and Inconel)	W. O. P.	PR A-1-k	No	W. O. P.	No	
Carbon Steel except any lot over 5 short tons:						
Plates*	W. O. P.	PR A-1-a	No	W. O. P.	No	*As defined in M-21-c.
Other Carbon Steel (Sheets)	W. O. P.	PR A-2	W. O. P.	W. O. P.	No	
Alloy Steel* except any lot over 2,000 pounds:						
Stainless Steel*	W. O. P.	PR A-1-a	No	W. O. P.	No	*As defined in M-21-d.
Terne Plate	W. O. P.	PR A-10	W. O. P.	W. O. P.	No	
Tin:						
Tin (including scrap)	No	No	No	No	W. O. P.*	*Only when sold as scrap.
Tin Solder	W. O. P.	PR A-9	W. O. P.	W. O. P.	W. O. P.	
Tin Plate	W. O. P.	PR A-10	W. O. P.	W. O. P.	No	

provisions of all applicable orders and regulations.

(2) The provisions of this regulation shall control all special sales although inconsistent with any order or regulation of the Director heretofore issued. Notwithstanding any provision of any such order or regulaion which permits such sale, no special sale shall be made if forbidden by the provisions of this regulation; and any special sale permitted by the provisions of this regulation may be made, and deliveries thereunder accepted by the buyer, despite any provision of any such order or regulation forbidding the same except that:

(i) Nothing in this regulation shall affect any provision contained in any order or regulation of the Director which imposes any quota or other limitation on the amount any buyer may purchase, receive or produce, or which imposes any limitations on the amount of inventory of any person or any restrictions upon the use of any material; and

(ii) This regulation shall not affect any provision of any applicable order or regulation of the Director requiring a buyer to make any reports or to furnish any information in connection with a purchase; and

(iii) No seller shall make any special sale if he knows or has reason to believe that the purchase or acceptance or delivery by the buyer would violate any inventory or quota restrictions imposed on the buyer by any order or regulation or that the buyer is acquiring the material for a use which would be in violation of any order or regulation.

Maximum Price Regulation No. 204

How to set approved prices on frozen materials in your inventories

FORMULAS designed to simplify the pricing of idle or frozen materials sold under Priorities Regulation No. 13, of the War Production Board, are contained in Maximum Price Regulation No. 204, which becomes effective August 20, 1942, Idle or Frozen Materials Sold under Priorities Regulation No. 13.

Maximum Price Regulation No. 204 is based on the principle that no purchaser of idle or frozen inventories should pay a price in excess of the price which he would be forced to pay had he purchased such materials from a regular supplier.

Idle or frozen materials are defined in the Price regulation as any commodity, accessory, part, assembly or product not in a form normally sold by the seller in the ordinary course of his business and sold or delivered pursuant to Priorities Regulation No. 13. It does not include any raw or unprocessed agricultural commodity.

Maximum Price Regulation No. 204 provides:

1. Wherever a specific dollar and cents maximum price exists which is applicable to the sale of idle or frozen materials by their present holder, the maximum price established by such regulation shall apply.

2. No maximum price is provided for sales to the original supplier of the material, or to another producer of the material on the grounds that the original supplier or other producer must resell at an established ceiling, thus avoiding any danger of a higher cost to any subsequent user.

3. In the case of materials sold to any other authorized buyer, for which no specific maximum price in dollars and cents terms exists, and which are sold in the same form in which they were originally purchased, the seller shall ascertain the maximum price which the original supplier is permitted to charge for the same or similar material and apply that maximum price to his sales.

4. In cases where the original seller no longer exists, or no longer sells the material in question, the seller of idle or frozen materials is permitted to charge a price not in excess of the actual delivered cost to him.

5. Idle or frozen materials which have been fabricated, processed, or otherwise altered, or alloyed, assembled, mixed or otherwise combined so that they no longer are in the form in which originally purchased by the seller, are put in two classes for pricing purposes.

In the first class are materials which have been fabricated or combined into a form in which other producers will find them readily usable for further fabrication or assembly. In such cases, the regulation permits the seller to receive a price equal to his cost of materials and labor, plus the percentage markup which he would have received had he been permitted to complete the fabrication or assembly into his normal product.

In the second class are materials which are not usable in their existing state in any currently permissible productive process. Since the fabrication or combination which has taken place possesses no economic value under present circumstances, these materials must be sold for scrap or salvage purposes.

6. In the case of materials which are not usable and for which a definite maximum price for sale as scrap has been established by a maximum price regulation, that maximum price shall apply. If there is no OPA ceiling price, and the material is sold to a scrap dealer, no maximum price is established by today's regulation. This is in line with the provisions of Supplementary Regulation No. 1 to the General Maximum Price Regulation.

However, if the materials are sold as scrap to industrial consumers and if there is no specific maximum price for their sale as scrap, waste, or salvage, Regulation No. 204 establishes a maximum price equal to 80 per cent of the delivered cost of the material to the seller.

A provision is contained in the new regulation whereby OPA can grant exception from all price regulations for the sales of materials to a Government agency under the terms of any government program for the purchase of surplus stocks.

On Our Industry's Front

Iron and Steel to Make Grates

IRON and steel necessary to facilitate the conversion of oil-burning furnaces to coal was allocated August 10 by the WPB to assure manufacture of grates and equipment for installation before winter.

The requirements committee of WPB has set aside 11,009 tons of iron and steel for grate manufacturers during the third and fourth quarters of 1942. This includes 7,546 tons of grey iron, 2,978 tons of steel, and 485 tons of other material. Manufacture of grates and other equipment can begin immediately upon delivery of the raw materials to the foundries. Preference rating of AA-3, top civilian goods rating, has been assigned to the delivery of such materials.

In order to get iron and steel for grates, a manufacturer should file form PD-25F, if he is operating under PRP, or form PD-1A if he is not. Ratings authorized by the requirements committee will be assigned to these application forms by the plumbing and heating branch.

Home owners and plant operators in 19 seaboard States and the District of Columbia were advised that Conservation Order L-41 is not a barrier to construction necessary to convert from oil burners. In a supplementary order—L-41-b—the WPB expressly ruled that such restriction does not apply to conversion installations begun before Janury 1, 1943, in the following States:

Connecticut, Delaware, Florida, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, Washington, West Virginia, and the District of Columbia.

◆

Prompt Repair of Heating Plants Urged

SIX reasons why necessary repairs to house heating plants should be made immediately are cited by the Plumbing and Heating Industries Bureau.

1. With the necessity for fuel economy to conserve transportation, every heating plant should be inspected promptly and put in efficient operating condition. Repairs made in time help to prolong the useful life of heating equipment and thus conserve metal as well as fuel.

2. Prompt action in ordering repairs and replacements now will insure delivery before cold weather and thus prevent discomfort.

3. Demand for repairs, replacements, and conversion equipment is expected to be unusually heavy this fall due to the fact that a million or more owners of oil fired heating plants in the east and far west will be in the market for an unprecedented tonnage of conversion equipment.

4. Plants that used to make furnaces, and heating accessories are now making munitions and ordnance materials. Less machinery and less manpower is available for civilian needs.

5. Raw materials are scarce. It takes time to get the approval of the WPB for metal required for repairs and maintenance.

6. Many journeymen have entered war industries with the result that less skilled labor is available for the repair and overhauling of heating plants this fall. Obviously homeowners who place their orders in time have first choice of the best workmen. Warm air plants should be serviced by competent warm air heating contractors.

◆

New Materials Flow Scheme

THE new overall program for controlling the flow of materials during the fourth quarter of this year has as its basis an entirely new method of handling Production Requirements Plan applications to keep the supply of materials in balance with requirement of the most essential war industries.

The program is divided into the following steps:

(1) The bulk of applications were received by the August 10 deadline. Nearly 23,000 fourth quarter applications have now been received.

(2) Each application is acknowledged as it is received. The applicant is notified of the serial number of his case and the branch to which it will be sent for processing.

(3) One copy of each application is sent to the Bureau of the Census, where the indicated total materials requirements will be tabulated in terms of over 200 end product classifications.

(4) Another copy of the application is sent to the branch responsible for processing it, where a tabulation of material requirements of all industries and companies assigned to that branch will be made.

(5) Both the Bureau of the Census and the various industry branch tabulations will be submitted to the Requirements Committee (see August issue) together with reports on prospective supplies for the quarter from the Materials branches.

After examination of the figures, the chairman of the Requirements Committee will determine the general pattern of materials distribution, both in terms of the 223 end products and in accordance with the companies assigned to the various branches, after setting aside a "kitty" for contingencies, readjustments, and for the use of smaller companies not under PRP.

(6) These determinations of the Requirements Committee will then go to the various industry branches, which will process the individual applications in accordance with the amounts of materials which may be authorized for each end product. At the same time, a strict check will be provided by the fact that each branch must keep the total authorizations to all of the companies whose applications it processes within the tabulation as approved by the Requirements Committee.

In authorizing receipt of materials by each company within the established limits, and in the assignment of preference ratings, the branches will be under rigid instructions to give the same treatment to similar cases. However, the inventory position of each applicant and the pattern of preference ratings

on the orders he will fill during the quarter will be given full consideration.

For the purpose of processing these applications, various units of the Army and Navy Munitions Board staff (such as ordnance, aircraft, etc.) will be treated exactly like industry branches, and they will process all applications from companies whose production is now 100 per cent military. The authorized quantities will be limited by the determinations of the Requirements Committee exactly like those of the industry branches.

(7) All processed applications, before being sent back to the applicants as approved PRP certificates, will be checked by a Review and Approval section.

(8) A copy of each PRP certificate authorizing receipt of scarce materials, or a report giving the same information, will be sent to each of the materials branches responsible for month-to-month allocations of the scarcest materials. On the basis of these authorizations, and of individual reports as required by the various "M" orders, the materials branches will fit the authorized deliveries of materials into the delivery schedules of primary materials producers.

(10) Careful checks will be made, company by company, to see that all materials authorized and received are actually put into production in the fourth quarter, or used to maintain a practicable working minimum inventory.

These checks will also reveal whether the materials should properly be put into production in the next quarter to meet delivery dates essential to the war program. Authorizations may be withdrawn if it is found that the items being manufactured are not required until some time after completion, even though the items themselves may be of great military importance.

(11) Materials in the "kitty" will be delivered on preference ratings assigned by P orders, PD-1A and PD-3A certificates, project ratings, and on interim applications under PRP. An account of such authorizations will also be kept so that preference ratings will not be assigned to a greater volume of materials than is available. This system is just being developed, and is not expected to work perfectly at first.

◆

Title I Permits Heating Conversion

CREDIT facilities under the FHA's Title I program are available to assist home-owners in carrying out heating and fuel economies through fuel conversion.

The Board of Governors of the Federal Reserve System has amended its Regulation W, to permit loans used to finance the conversion of heating equipment from one type of fuel to another, or to reduce fuel consumption by better insulation. Such loans may run for as long as three years and are repaid in equal monthly instalments.

Home-owners in areas of short fuel-oil supplies who now heat their houses with oil-burners may finance the conversion of their furnaces to the use of coal through FHA-insured Title I loans, thereby assuring the comfort of their families during the winter months as well as helping in the solution of the critical oil supply problem.

Similarly, by installing improved insulation, or storm doors, storm windows and weather stripping, home-owners can keep the heat in their houses and the cold outside. Such improvements also can be financed under the Title I plan.

◆

Bar Artificial Gas Heating

IN a drive to conserve fuel the War Production Board has restricted deliveries of artificial gas to new consumers.

The curb on artificial gas was in the form of an order prohibiting gas deliveries after Sept. 1 for the heating of homes, stores, offices, or factories unless equipment for such heating is installed prior to that date. The order exempts from its provisions places where new heating equipment is installed after Sept. 1 to replace gas burners of the same or larger capacity.

The order also provides that gas deliveries may be allowed by equipment installed in a new building prior to Nov. 15 provided that such equipment was specified in the construction contract and the foundation of the building is completed before Sept. 1.

Utilities which feel that their capacity and fuel supply are adequate to handle present and estimated future requirements of war industry and unrestricted civilian use may apply to WPB for exemption.

◆

Limitation Order L-173

THE War Production Board August 5 issued Limitation Order L-173, cutting off further production of domestic space heaters calling for the use of fuel oil or gas except to fill orders for the Army, Navy, Coast Guard, Maritime Commission or War Shipping Administration.

Types of heaters covered by the order are those designed to heat only the space in which they are located and which are not equipped with distribution pipes. Included are circulating heaters, radiant heaters, direct fired gas unit heaters, and floor and wall furnaces. The order covers heaters using grades No. 1, 2, 3, 4, 5, 6, Bunker "C" oil, kerosene, range oil, gas oil.

The order permits the production of replacement parts so that units now in operation can be kept serviceable.

The Plumbing and Heating Branch estimates that manufacturers and dealers have stocks of 200,000 oil heaters and 300,000 gas heaters on hand.

◆

Relief for PRP Applicants

AN extended interim procedure for applicants under the Production Requirements Plan who have not received their PRP certificates has been provided.

Class I producers—companies using more than $5,000 worth of metal in a quarter which are required by Priorities Regulation No. 11 to obtain priority assistance under PRP—are permitted by the amendment to accept delivery of up to 70 per cent of their indicated requirements for the quarter in the first and second months, if they have submitted a

(*Continued on page* 99)

Interpretations, Amendments, Easements To Existing Orders

L-63 Amended

PART 1046 is hereby amended to read as follows and as so amended supersedes all amendments to and exemptions under L-63 heretofore issued by the War Production Board:

§ 1046.1 *Suppliers' Inventory Limitation Order L-63.*[1]—(a) *Definitions.* (1) "Supplies" means all the supplies listed below:

(i) Automotive supplies.
(ii) Aviation supplies.
(iii) Builders' supplies.
(iv) Construction supplies.
(v) Dairy supplies.
(vi) Electrical supplies.
(vii) Farm supplies.
(viii) Foundry supplies.
(ix) Grain elevator supplies.
(x) Hardware supplies.
(xi) Industrial supplies.
(xii) Plumbing & heating supplies.
(xiii) Refrigeration supplies.
(xiv) Restaurant supplies.
(xv) Textile mill supplies.
(xvi) Transmission supplies.
(xvii) Welding & cutting supplies.

Except that "supplies" shall not be deemed to include any of the materials set forth in List A.

(2) "Supplier" means any person (other than a producer) located in the 48 states or the District of Columbia, whose business consists, in whole or in part, of the sale from stock or inventory of supplies. "Supplier" includes wholesalers, distributors, jobbers, dealers, retailers, branch warehouses of producers and other persons performing a similar function.

(3) "Producer" means any person including any branch, division or section of any enterprise, which manufactures, processes, fabricates, assembles or otherwise physically changes any material.

(4) "Sales" means sales from stock including consigned stocks and excluding direct shipments.

(5) "Seasonal lines" means any line of supplies in which a minimum of 40% of the supplier's total annual sales are made during a period of 90 days, or less.

(6) "Maximum permissible inventory" of supplies means:

(i) In the case of a supplier located in the Eastern or Central War Time zones, an inventory (owned or consigned to him) of supplies of a total dollar value (by physical or book inventory, at the option of the supplier) equal either to

(*a*) Twice the sales of such supplies, shipped from his inventories, during the second preceding calendar month; or (at the option of the supplier);

(*b*) Two thirds of the sales of said supplies shipped from his inventories during the three preceding calendar months.

(ii) In the case of a supplier, located in any other time zone, an inventory (owned or consigned to him) of supplies of a total dollar value (by physical or book inventory, at the option of the supplier) equal either to

(*a*) Three times the sales of such supplies shipped from his inventories, during the second preceding calendar month; or (at the option of the supplier);

(*b*) The sales of such supplies, shipped from his inventory, during the three preceding calendar months.

(b) *Limitation of supplier's inventories.* (1) Except as provided in paragraph (b) (3), (4), (5), and (6), no supplier shall accept any delivery of supplies from any person which will effect an increase in the inventories of the supplier above his maximum permissible inventory; and

(2 Except as provided in paragraph (b) (3), (4), (5) and (6), no person shall make to any supplier any delivery of supplies which such person knows or has reason to believe will effect an increase in such supplier's inventory of supplies above the supplier's maximum permissible inventory.

(3) The supplier in any time zone shall be permitted to purchase and store an amount of seasonal lines equal to those which he purchased in the peak period of a comparable period of the previous year, but this peak period shall not exceed ninety days.

(4) A supplier may accept delivery of supplies which will increase his stock above the maximum permissible inventory, if such supplier's inventory of supplies is at the time of delivery less than his maximum permissible inventory and the delivery is of the minimum quantity of such supplies that can be commercially procured.

(5) A supplier may accept delivery of specific items of supplies when his stock of all items in the aggregate exceeds or will by virtue of such acceptance exceed, his maximum permissible inventory, but only to the extent necessary to bring such supplier's inventory of those specific items (owned or consigned to him) up to a total dollar value equal to the sales of such items shipped from such supplier's inventories during the preceding month.

(6) The Director General for Operations may, from time to time, exempt specified suppliers or classes of suppliers from the provisions of this order, subject to such restrictions as the Director General for Operations may impose.

(7) The provisions of this order shall not apply to any supplier:

(i) Whose total inventory at cost, including consigned stocks, of all supplies is less than $20,000.00, and;

(ii) Whose total inventory at cost of each type of supplies as set forth in paragraph (a) (1) of this order, is less than $10,000.00.

[1] 7 F.R. 4400.

(c) *Provisions of other orders.* No provision of this order shall be construed to permit the accumulation of inventories of any item of material in contravention of the provisions of any other applicable order or orders issued by the War Production Board or heretofore issued by the Office of Production Management.

(d) *Appeals.* Any person affected by this order, who considers that compliance therewith would work an exceptional and unreasonable hardship upon him, may apply for relief to the War Production Board by telegram or letter setting forth the pertinent facts and the reason such person considers that he is entitled to relief.

LIST A

The types of material set forth below are not deemed to be supplies within the meaning of paragraph (a) (1). Accordingly, these materials may be excluded from the monthly report required by paragraph (e), and are not subject to the inventory restrictions required by paragraph (b), provided that sales of such materials are not included in computing maximum permissible inventory as defined in paragraph (a) (6).

(1) All materials referred to in schedules A and B of § 962.3 (*General Preference Order M-21-b*, as amended from time to time);

(2) Materials made of aluminum, provided such materials were acquired by the supplier pursuant to allocation or other specific authorization of the Director of Industry Operations or the Director General for Operations of the War Production Board;

(6) Any material which is subject to rationing by the Office of Price Administration;

(7) The following building materials: Portland and natural cement, lime, gypsum and gypsum products, bituminous roofing materials, concrete pipe, cut stone, sand and gravel, crushed stone, clay products, insulation board, acoustical materials, mineral wool, paving materials, concrete products, glass, lumber, wooden mill work.

◆

L-79

TWO amendments to Limitation Order L-79, covering certain plumbing, heating and cooking equipment, were issued August 11 by the War Production Board.

One of the amendments includes the following gas-burning heating equipment in the terms of the order: steam and hot water heating boilers, warm air furnaces, floor furnaces, unit heaters, conversion burners, and gas steam radiators.

Order L-79 provides that "no person shall sell or deliver" any equipment covered by the order to an ultimate consumer, except that:

Cooking stoves, heating stoves and water heaters may be sold to householders where no other equipment for cooking or heating purposes is available.

The sale of any equipment needed to convert oil and gas burners to coal is permitted.

No restrictions are placed on sales amounting to $5 or less, provided such sales are part of an order totaling no more than $10.

Sale and delivery is permitted of any equipment on an A-10 or better preference rating. (Preference Rating Order P-84 assigns such a rating for repair and maintenance purposes.)

Sale and delivery of any equipment specifically designed for hospitals, or for surgical, veterinary, barber shop or beauty shop use is permitted.

Sale and delivery of any equipment is permitted if the purchaser certified that it is needed to complete a project authorized by WPB in accordance with Construction Order L-41.

Sale and delivery is permitted on the specific authorization of WPB.

An additional exception, which permitted the sale of oil burners when such transactions were made for purpose of reducing consumption of fuel oil, is revoked by one of the amendments (Amendment No. 2).

◆

Amendment-PR 11

AN extended interim procedure for applicants under the Production Requirements Plan who have not received their PRP certificates is provided by Amendment No. 3 to Priorities Regulation No. 11, announced August 6.

Class I producers—companies using more than $5,000 worth of metal in a quarter which are required by Priorities Regulation No. 11 to obtain priority assistance under PRP—are permitted by the amendment to accept delivery of up to 70 per cent of their indicated requirements for the quarter in the first and second months, if they have submitted a PRP application as required and have not yet received their certificate.

In order to obtain such material, they may apply or extend ratings on orders received by them, or may use ratings under any "P" order under which they have previously operated, even though the "P" order may have expired so far as other producers are concerned.

Class I producers who have submitted their PRP applications for the fourth quarter may also order for delivery in October up to 40 per cent of their indicated requirements, and for delivery in October and November up to 70 per cent of such requirements, prior to receiving their certificates. However, all material delivered under the interim procedure in either the third or fourth quarter must be deducted from the amounts authorized on the certificate when it is received.

◆

Tetrachloride Released

A TEMPORARY surplus of carbon tetrachloride for which storage facilities are inadequate has resulted in easing of restrictions on its use. The Director General for Operations issued Amendment No. 1 to Order M-41 which doubles the quantity certain users may consume between now and September 30.

Users are those to which a B-2 rating is assigned; degreasing machines other than those used for Army and Navy contracts, packaged spotting and cleaning preparations, dry cleaning establishments and for manual cleaning of other than metal parts of electrical equipment.

The order previously restricted deliveries to B-2 users to 50 per cent of their average monthly consumption for the year ending Septemer 30, 1941. This new action raises the percentage to 100 per cent.

(*Continued on page* 91)

Priority Questions and Answers

PR-13 (Sale of Frozen Inventories)

THE following questions and answers on Priorities Regulation No. 13 were prepared by the Inventory and Requisitioning Branch of the War Production Board.

Q. What determines sales that are covered by Priorities Regulation No. 13 and are therefore "special sales"?

A. *There are three main tests to be applied*:

(A) Does the seller regularly sell such items as part of his established business? If so, the sale is *not* a "Special Sale" and is *not* affected by Priorities Regulation No. 13.

(B) Is the item a tool, machine or an assembled piece of equipment? If so, the sale is *not* covered by Priorities Regulation No. 13. For instance, sales of electric motors, stoves, boilers and such assembled units are not covered.

(C) Is the item in the class of foodstuffs or finished consumers goods which are used in the form bought, without being made part of a further assembly or structure? If so, the sale is *not* covered by Priorities Regulation No. 13.

If the sale is excluded by any one of the tests mentioned above, the regulation does not apply and the sale remains covered by any other applicable orders.

Q. Is a "Special Sale" limited to what may be considered idle or excess stocks?

A. Although in most cases "Special Sales" will be out of idle or excess inventories, the definition of a "Special Sale" is *not* so limited.

Q. To whom can "Special Sales" of "War Materials" be made?

A. "Special Sales" of war materials are permitted as follows:

(A) To certain government agencies, such as the War Department, Navy Department, Maritime Commission, Board of Economic Warfare, and corporations organized under the Reconstruction Finance Corporation Act.

(B) To buyers specifically authorized by WPB.

(C) By a producer to another producer engaged in the same business as the seller, if authorized by a WPB order expressly permitting such sales.

(D) In individual lots at an aggregate price of less than $100.

(E) To certain classes of buyers, as indicated in Schedule "A" of Priorities Regulation No. 13, such as producers, reprocessors, wholesalers and scrap dealers.

(F) If a sale is permitted under one or more classifications, it is permitted by the Regulation.

Q. How do you determine whether or not a "Special Sale" of a product containing "war material" is permitted by Schedule "A" of Priorities Regulation No. 13?

A. Schedule "A" is a list of critical materials which are of major importance to war production. It also sets forth the conditions under which a "Special Sale" of a war material is permitted to certain classes of buyers. Thus, in order to determine if a "Special Sale" of a specific war material is permitted by Schedule "A" the following steps are taken:

(A) Locate the name of the material (listed in alphabetical order) under one of the three groupings: *metals, chemicals, miscellaneous.*

(B) Find the symbol which appears opposite the material and in the column which describes the prospective buyer.

This symbol indicates the conditions under which the sale can be made. For example: the symbol "WOP" means "without preference rating"; "PRA-1-k" means that the holder *may* sell the particular war material, provided the prospective purchaser has a preference rating of A-1-k or higher. "NO" means that the sale is not permitted to that particular class of buyer without specific WPB authorization. "X" means *"not applicable."*

(C) If a sale is a "Special Sale," the terms on which it can be made are described in the Regulation. If a sale is *not* a "Special Sale" the Regulation does not affect it.

Q. Can "Special Sales" be made of materials not included in Schedule "A"?

A. Schedule "A" lists only the critical materials and shows the conditions under which these materials may be sold. *"Special Sales" may also be made of materials not on Schedule "A" without restriction.*

Q. What are the restrictions on the buyer in a "Special Sale" under Priorities Regulation No. 13?

A. The buyer remains bound by present restrictions and Regulations of WPB which control the amount of materials which he may receive or produce, and the uses he may make of these materials. He is also required to submit any reports and information in connection with purchases which are required by any order or other Regulation. With these exceptions, the buyer is authorized to acquire material through a "Special Sale" if the seller is authorized to sell.

Q. May a "Special Sale" be made in accordance with some other order or regulation if not permitted by Priorities Regulation No. 13?

A. If a "Special Sale" is not permitted by Priorities Regulation No. 13, it may *not* be made even though permitted under an order issued prior to July 7, 1942. The provisions of this Regulation control all "Special Sales" and supersede all orders and Regulations issued prior to Priorities Regulation No. 13.

Q. May a "Special Sale" be made if permitted by Priorities Regulation No. 13 and forbidden by another order or regulation?

A. Priorities Regulation No. 13 supersedes any Priorities Regulation or order issued prior to July 7, 1942. A "Special Sale" *may* be made if permitted by Priorities Regulation No. 13 without reference to any order or regulation issued prior to July 7, 1942.

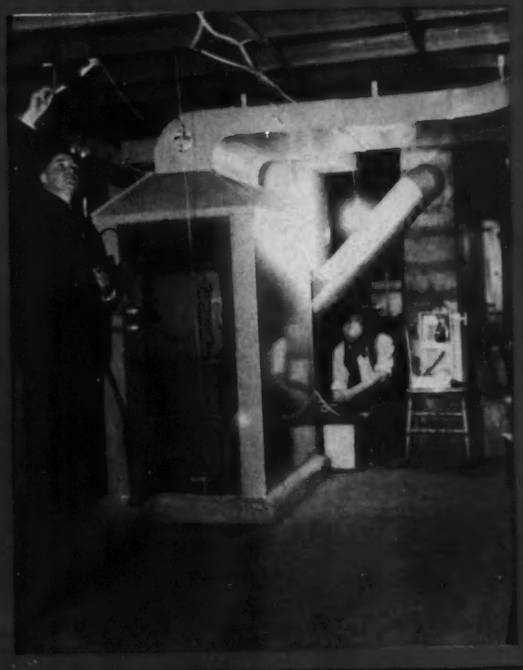
Q. Does paragraph (C)(2)(i), which permits "Special Sales" to certain government departments and agencies, permit "Special Sales" to a prime contractor of such departments or agencies?

A. This paragraph does not permit a "Special Sale"

(*Continued on page* 103)

RESIDENTIAL AIR CONDITIONING

SECTION



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DUST is a major problem both in the *manufacture* and *maintenance* of our great air armada. The important part which dust control plays in *manufacture* was soon discovered by airplane builders who turned to AAF engineers early in the war emergency to solve their dust problems.

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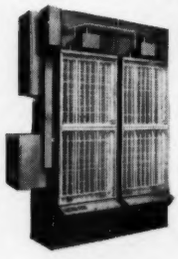

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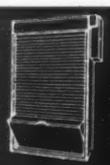
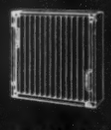

SELF-CLEANING AIR FILTER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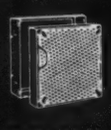
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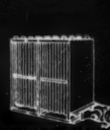
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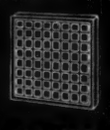
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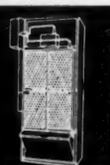
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Keep 'em Heating

Maintaining existing heating plants in highest possible heating efficiency and advising the owner on what he can do to conserve fuel is the patriotic duty of every furnace dealer. These "Keep 'em Heating" articles will summarize the latest technical and merchandising thought of the industry.

***

Case	Insulation		Weather Strip	Storm Sash	Calculated Hourly Heat Loss in Per Cent of Maximum Rate (0 20 40 60 80 100)	Reduction, %
	Wall	Ceiling				
a	None	None	None	None		0
b	1-in.	None	None	None		12.8
c	2-in.	None	None	None		17.4
d	3-in.	None	None	None		19.7
e	3⅝-in.	None	None	None		20.3
f	None	1-in.	None	None		11.3
g	None	2-in.	None	None		13.3
h	None	3-in.	None	None		14.1
i	None	3⅝-in.	None	None		14.5
j	3⅝-in.	3⅝-in.	None	None		34.8
k	None	None	Yes	None		9.8
l	None	None	None	Yes		31.3
m	3⅝-in.	3⅝-in.	None	Yes		66.1

FIG. 65. CALCULATED HEAT LOSSES FOR TYPICAL RESIDENCE
(U. of I. Eng. Exp. Sta. Circular 26, p. 109)

e. Does this includes oil for heating domestic hot water?

f. Make of furnace and burner.

g. Size of burner.

h. Can furnace be converted to coal firing?

i. What is gallon consumption per 1000 sq. ft. of floor area?

An examination of the data thus accumulated should present a clear picture to the heating contractor as to which installations are consuming an excessive amount of fuel. These installations should receive especial attention. A carefully arranged service agreement, covering some of the items to be discussed in these articles, will be mutually beneficial to both home owner and heating contractor, and will be in accordance with the nationwide plan of fuel conservation.

Storm Sash and Insulation

Now is the time for the heating contractor to approach the home owner on the possibility of installing storm sash or using insulation. Both of these items should be included in the services offered by a heating contractor since he is in a better position to advise the homeowner than the usual builder's supply house. This service should include hanging, fitting, and painting the storm sash. The effectiveness of storm sash is governed to a great extent by the tightness with which it is applied to the frame.

Fig. 65 shows calculated reductions in heat loss from a typical frame structure, and is reproduced from the book "Winter Air Conditioning." Tests made in the Research Residence have indicated that a factor of safety should be applied to these calculated reductions in heat loss in order to obtain reasonable estimates of reductions in fuel consumption. The National Mineral Wool Association recommends that calculated reductions in heat loss be reduced 20 per cent for safety. For example, item (m) in Fig. 65 gives a calculated reduction of 66.1 per cent with full thickness insulation applied to the sidewalls and ceiling, and with storm sash applied to all windows. Reducing this value by 20 per cent gives an estimated fuel reduction of 0.8 x 66.1 or 52.9 per cent. This is in reasonably good agreement with the tests made in the Research Residence.

Calking

Many troublesome heating complaints have been traced to air leaks around window frames and to cold air blowing into a room through cracks in the baseboard. In the latter case a very thin sheet of cold air will spread over the floor and give rise to complaints about cold floors. The localized cold spots can be readily located by walking with bare feet over the floors, and along the floors near the exposed walls. Blowing tobacco smoke near the baseboard at suspected spots will verify the presence of cold air leaks. The open space left around the chimney may allow air to blow down from the attic and leak into the rooms below. Obviously the space around the chimney at the attic floor level should be tightly plugged with mineral wool. All studding spaces should also be capped. The cracks around window frames and doors should obviously be caulked. The heat which enters a basement from the furnace casing, air ducts, and smokepipe keeps the basement warm and to some extent heats the floors of the first story rooms. Hence an excessively leaky basement wastes heat which might be utilized. It is true that air is required for proper combustion of the fuel and that a certain amount of leakage is therefore necessary. In many installations, however, broken windows, loosely fitting doors and windows, and cracks around the sill plate cause air leakages far greater than are required for combustion purposes.

Reducing Heat Loss From Bedrooms

If bedroom windows are left open at night the incoming cold air will blow into the room and

leak into the house through the spaces under the doors. Door stops are advisable. Medical opinion has begun to swing back to the idea that for adequate ventilation it is not necessary to open the windows wide and freeze the occupants. Some medical authorities have ventured the opinion that some of the sinus and nasal complaints might be aggravated by such exposure. At any rate the quantity of air leaking in through even a one inch opening of the windows is more than sufficient for normal ventilation requirements.

Closing Fireplaces

When fireplaces are not in use the dampers should be closed. Contrary to the commonly held opinion, an ordinary dwelling is far from an air tight enclosure. Tests conducted by Prof. Larson of the University of Wisconsin indicated that when outside air was pumped into a schoolroom of solid brick wall construction the air leaked out readily through numerous minute cracks and no appreciable pressure increase inside of the building was noted. In domestic dwellings the fear of lack of fresh air for health requirements is largely unfounded. The main requirement for ventilating air is for purposes of diluting odors arising from the body, and from cooking, and smoking. If odors are under control the required ventilation for health requirements is automatically satisfied.

Cutting Off Unused Rooms

By cutting off the heat supply to unused rooms and keeping the doors and windows closed, a small amount of fuel saving should be effected. Due to the fact that the isolated room will receive heat from interior walls and floors, the room temperature will be considerably above outdoor temperature, and the reduction in fuel will not be proportional to the amount of outside exposure that has been reduced.

Reducing House Temperatures

Over a large part of the heating section of the country a reduction of 1 deg. F. in average room temperature corresponds to about 3 per cent reduction in heat loss. In those few cases in which house temperatures have been maintained as high as 85 deg. F. it would be feasible to reduce room temperatures by as much as 10 deg. F. In general, however, home owners do not deliberately waste fuel by overheating, so that flat reductions in temperature of 10 deg. F. would be rather dangerous to recommend as a uniform practice. The presence of babies, elderly people, and invalids, and the general health of the occupants should be given consideration. Any fuel conservation campaign should call for a simultaneous campaign for people to dress more warmly. Women, due to the lightness of their attire, may require 2 or 3 deg. warmer temperature than men. Since house temperatures are usually set to meet the women's needs, no campaign to reduce house temperatures will get any place until women are instructed to wear warmer clothing.

It has been the writer's general experience that apartment dwellers, who do not directly pay for their heating, are more extravagantly wasteful of heat than home owners who realize that heating the great outdoors is a rather expensive procedure. Red flannel underwear may again have its day.

Many of the preceding items are small items which may only save a shovelful of coal. The proper educational campaign will point out that all of the items taken together may save several bucketfuls. The bucketfuls, multiplied by the millions of homes in the country, will make an enormous difference in the fuel requirements. Heating contractors can do much to assist in this important work.

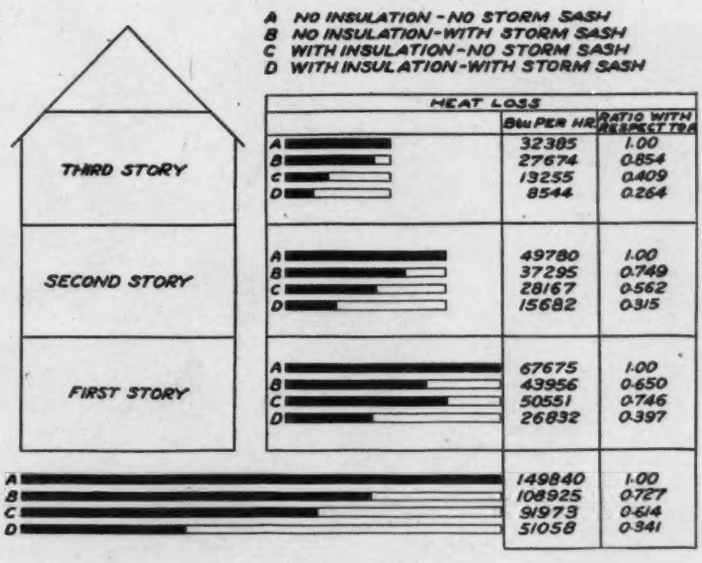


Fig. 3—Calculated heat losses from Research Residence for 80 F difference

Converting Oil to Coal Should Be a M

KEEP 'em HEATING

THE serious threat of heating oil shortages in Eastern states this coming winter places a responsibility on warm air heating dealers—the responsibility of telling their customers just what can be done with their present equipment to guard against heatless days or curtailment of oil supplies to the point where comfort is jeopardized.

The situation as we enter the heating season is briefly this—loss of tankers which ordinarily carry oil to the Eastern states plus increasing use of tank cars to transport gasoline and oil for the fighting forces has prevented ordinary pre-heating season storage accumulations. Also, owners have been restricted in laying in stocks of oil beyond a small gallonage. No great increase in monthly shipments is in sight so without accumulated stocks a shortage is threatened.

Big Drives to Convert Are Going On

As of the first week in September, these measures have been taken: A government campaign has been launched to convince owners of oil burners that they should convert to coal wherever possible; a new pipe line has been started but will not be ready until the first of next year; governors of the states affected have started a campaign to stimulate conversion from oil to coal; WPB has appointed a committee which will determine, first, whether or not the use of fuel oil shall be curtailed by law and, second, what method of rationing shall be used if curtailment is imposed.

The situation today is this: less than one per cent of domestic oil burner owners have already converted to coal or other fuel; as a result, some 1,250,000 oil burner owners face serious consequencies during the coming winter.

Situation in a "Nut Shell"

The important place occupied by the warm air heating dealer is shown by various surveys made in recent months to determine just what can be done in conversion to ward off possible discomfort. One of the most authentic surveys was made by Anthracite Industries which sent engineers out to survey a typical cross section of the house heating field and discovered these facts—

1—Approximately 80 per cent of the domestic oil burning installations were originally designed for coal or use substantially the same type of furnace or boiler as was designed for coal.

2—Approximately 10 per cent of the domestic oil burning installations are of such a type that with a reasonable change over coal can be burned although reconstruction in some types must be extensive.

3—Approximately 10 per cent of the domestic oil burning installations are of such a type (special oil burning furances) that alteration is impossible and a new heating plant is required.

In the 80 per cent in class 1 conversion from oil to coal requires only the removal of the oil burner and the installation of grates. In class 2 provision for firing and ash accumulation and removal is necessary, but can be done.

In class 1, where a conversion burner has been used in a former coal burning heater, there are three classifications determining what the furnace dealer must or can do and what the home owner must procure. These are:

1—About 30 per cent of the class 1 owners or about 380,000 heating plants still have stored away the original grates and lugs so all the owner has to do is take out the burner and put back his lugs and grates. Oil burner brick work may have to be removed. Most of these owners also have their fire doors, frames, ash pit doors and frames, dampers and other accessories.

2—The second group of owners have the necessary lugs and fittings but do not have grates. About 27 per cent or 335,000 owners are in this group. These owners must buy grates, conversion is relatively easy and inexpensive.

Repair Parts Are Available

In this class two government measures have recently been passed to make conversion possible and easily financed. Interpretation 1 to Order L-22 (see page 19, August ARTISAN) permits furnace manufacturers to produce replacement and repair parts over and above the furnace quotas set by the order. Secondly, a new ruling by Federal Reserve Board removes restrictions on credit payments for fuel conservation measures. A quick survey of the furnace manufacturers and jobbers indicates that relatively large stocks of grates, lugs, doors, frames are ready in stock.

The third group of owners, approximately 32 per cent or about 395,000 owners, lack one or more of the essential parts for installation of standard grates. Lugs were removed and lost, fittings were taken off and discarded or the heater was so altered that standard grates cannot be reinstalled.

For this type of owner, one of the replacement grate sets seems necessary. This replacement grate has its own supports and can be inserted in the ash pit in a few minutes. There are sev-

Major Fall Activity For Every Dealer

eral types of these replacement grate sets now on the market—some are being advertised widely; some are for one particular type of fuel, but all together these sets make possible conversion of almost any type or age of heater.

85% of Owners Can Easily Convert

It seems, then, that 80 to 90 per cent of all oil burning installations in areas facing possible curtailment or shortage can be converted to solid fuel at little expense to the owner. What seems to have happened is that the publicity campaign so far has not made clear to the owners that this conversion can be done with little trouble and at small expense.

Here is where the heating dealer can step into the program. If publicity and news stories have not convinced the owner that he should convert, a personal call from the heating man seems to be the logical next move. On such a personal solicitation the exact problem can be presented with literature, photographs, and a personal inspection made to determine what must be done.

Even where the owner has his grates, lugs, fittings, etc., the heating man can legitimately recommend several services beyond the replacement of the grates. For example, cleaning. This year, more than ever before, a clean furnace is desirable—not only because it provides better heat and saves fuel, but also because efficient equipment helps the war effort.

By All Means Check Controls

And the control system. In the usual conversion job there may never have been any control equipment for coal. When the oil burner was installed a thermostat was installed to start and stop the burner. Probably a high limit control was put into the burner circuit to stop the burner should temperature get too high. This may or may not be wired into the thermostat circuit.

When the owner changes back to coal he needs a damper motor to open and close the draft door and check. By all means he needs a high limit control to shut the draft door at pre-determined high bonnet temperatures even though the thermostat is not satisfied.

Where the old system has also been improved by the addition of a blower, the heating man can well afford to check the setting and operation of the control system. With an oil burner going on and off without attention and with rapid heat pickup, a poorly adjusted control system can give satisfactory heat if the owner is not overly critical or sensitive. But when this forced air system is changed back to coal a different set of characteristics must be expected.

To illustrate, the thermostat calls for heat after a long standby period. The coal fire is low. It takes quite a while for the fire to pick up and, meanwhile, the house gets colder and colder. The fan does not run and the owner begins to cuss. Then when the fire does get under way the house is cold and takes a long time to come back up to a comfort condition. Meanwhile the fire gets hotter and hotter and when the thermostat is finally satisfied a large temperature overrun must be expected.

The remedy, of course, is a sensitive thermostat, or a heat anticipating unit; also a high limit control set low enough to cut in and shut off the draft several times or a long time before the thermostat is satisfied. This arrangement and the sensitive instruments, carefully adjusted, probably were not used when oil was the fuel because oil is on quick, off quick; hot and cold in a few minutes.

Be Sure to Talk Insulation

There are other things the heating man can do when he is making his preliminary conversion inspection. Fuel saving is going to be one of the public's major efforts this winter. The home owner will be swamped by campaigns and appeals to save fuel. There are numerous ways fuel can be saved—several enumerated in Professor Konzo's article in this issue.

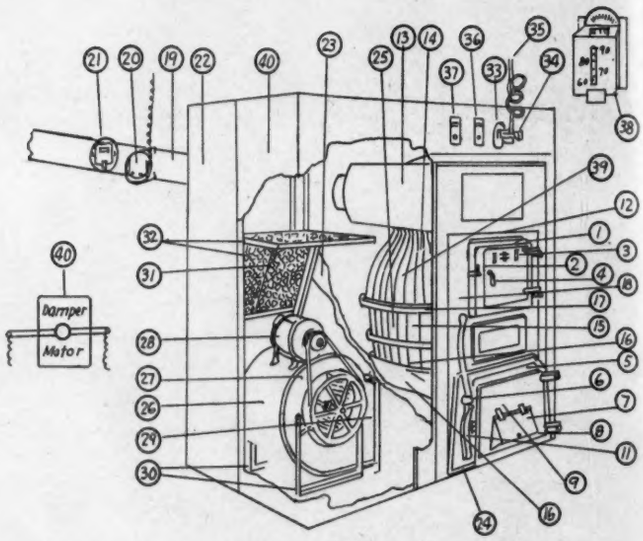
Government is suggesting fuel conservation by putting insulation in the attic floor; insulation in the side walls if possible; application of storm windows and doors; weatherstripping and caulking—and is telling the public these measures will cut the fuel consumption 10 to 15 per cent.

The American Society of Heating and Ventilating Engineers is publicizing a 10-point program to save fuel, including all the above, plus—lower temperatures at night; shutting off unused rooms; insulate the furnace and water heater; check combustion efficiency and recondition the heating plant. A.S.H.V.E. believes in some houses as much as 60 per cent of the fuel used last season can be saved.

The home owner is not aware of all these measures he can take to save fuel and still be comfortable and it is doubtful whether or not the average owner will take time to study all the campaign material coming to him in his newspaper, magazine or over the air. Only when someone pins him

(*Continued on page* 101)

Check Sheet for Furnace Inspection



IF a complete check of the furnace is to be made for the purpose of advising the home owner what is needed to put the heating plant in first class condition for the winter, the first thing the contractor needs is a routine to be followed in making the check.

The safest method for assuring a complete inspection is to have a standard type of check sheet on which all possible points of failure or deterioration are entered. Such a check sheet has the added advantage of obtaining the same complete check no matter what member of the organization makes the inspection.

From a number of sources the accompanying check list has been compiled. In addition to the questions, a drawing of a coal burning, gravity or blower furnace is included so that the inexperienced solicitor will know where to look.

In the case of the straight gravity furnace the blower, filter, etc. questions are ignored. If there is an oil burner or a stoker a supplementary check sheet will be shown in a later issue; the two check sheets can then be pinned together and entered in the file.

Under the present emergency, with new furnaces difficult to obtain unless absolutely needed, it becomes more than ever important for the home owner to have his furnace thoroughly inspected so that any part which seems likely to give trouble can be taken care of at once. Hit or miss inspection seldom gives a satisfactory check; some sort of detailed survey is needed—the suggested check sheet is an effort toward that end.

It will be noted that a number of the questions cover operations the average furnace dealer will naturally do when inspecting or cleaning a furnace. But we purposely made the check list long and complete with the idea that the contractor will fill in and submit a copy to the owner to show the owner just what was done. The automobile service agencies are all now doing the same thing. When you have your car inspected you get a long check list to show just what was done and what condition the car was in. This idea is just as applicable and more important to the home owner with a furnace, hence the long list.

Name of owner or tenant.....
Address of furnace checked.....
Make and model of furnace.....
Approximate age of furnace.....
Inspection report given to.....
Repairs ordered by .....

1—Firing door and frame: Ok....; Warped....; Broken.....
2—Firing door latch: Ok....; Broken.....
3—Secondary air slide: Ok....; Stuck....; Broken.....
4—Firing door seal: Ok....; Shows crack.....
5—Ash pit door and frame: Ok....; Warped....; Broken.....
6—Ash pit door seal: Ok....; Shows cracks.....
7—Draft door: Ok....; Warped....; Broken....; Chain operates.....
8—Draft door seal: Ok....; Shows cracks....; Chain operates.....
9—Ash pit: Clean....; Full.....
10—Grates: Ok....; Broken....; Right type and size.....
11—Shaker handle: Ok....; Broken....; Linkage ok.....
12—Front: Ok....; Need paint....; Cracked.....
13—Radiator: Ok....; Cracked....; Clean.....
14—Combustion section: Ok....; Cracked....; Warped.....
15—Fire Pot sections: Ok....; Warped....; Cracked.....
16—Ash pit section: Ok....; Warped....; Cracked.....
17—Section joints: Tight....; Need cement....; Broken.....
18—Feed pouch: Ok....; Broken....; Cracked.....
19—Smoke pipe: Ok....; Rusty....; Any holes.....
20—Check door: Ok....; Operating....; Seal.....
21—Draft adjuster: Ok....; None....; Properly set.....
22—Casing: Ok....; Broken or dented.....
23—Liner: Ok....; Baffles in place....; Tight.....
24—Base ring: Sealed.....
25—Fire brick: Ok....; Broken....; None.....
26—Blower: Ok....; Clean....; Oiled.....
27—Blower pulley: Ok....; Loose....; Tight....; Right size .....
28—Blower motor: Ok....; Oiled....; Neglected.....
29—Blower canvass seal: Ok....; Open.....
30—Blower anchor: Ok....; Loose; Broken.....
31—Filters: Ok....; In place....; Dirty....; Right type.....
32—Filter seal: Ok....; Shows cracks....; No proper seat.....
33—Humidifier: Operating....; Limed....; Dirty....; Right size.....
34—Humidifier valve: Operating....; Limed....; Shut off.....
35—Humidifier water line: Ok....; Broken....; Right size.....
36—Blower control: Operating....; On at....; Off at.....
37—High limit control: Operating....; Set at.....
38—Thermostat: Operating....; Points clean.....
39—Is furnace clean....; Cleaning ordered.....
40—Damper Motor: Operating Ok....; Response slow....; Oiled.....

Proper Humidification Lowers Heating Costs

Recently a flood of publicity has been released purporting to prove that proper humidification does not and cannot effect any discernible reduction in house heating costs. Mr. Kuenhold, author of previous articles on humidification published in American Artisan, here presents mathematical proof that humidification does save fuel.

By O. J. Kuenhold
Humidification Engineer, Monmouth Products Company

ADDING moisture to air at any given temperature makes it seem warmer. We all know that when the air on a hot summer day is highly humid, it feels hotter than the thermometer indicates. Similarly, air that is abnormally dry, as air in an unhumidified home during cold weather, feels cooler than it actually is.

Tests made in a gas heated, thermostatically controlled home, over an extended period, shows that when the humidity is increased by 19.3 grains of moisture per pound of air (17½ per cent points of increase) the same comfort is felt at 70° with humidification as at 74° without added humidity. In other words, 4° less heating was required in this case. Laboratory tests made by ASHVE under similar humidity differences show a 2° differential, but these tests were of but two or three hours duration and not under actual living conditions. It is therefore safe to say that moderate humidification will conservatively enable 3° lower room temperature to be carried without any sacrifice of bodily comfort. There will however be distinct gains in breathing comfort.

Calculations of Heat Loss Reduction

Having determined that 3° less heating is a conservative assumption, we can calculate the actual percentage of saving in fuel costs by methods which are universally accepted as accurate and correct. As a representative example, assume an uninsulated, but weather-stripped house of 10,000 cubic feet of inside space, average construction, glass exposure, etc. An inspection of weather statistics shows that average winter weather of 35° is a fair assumption. To heat such a house to 73° during 35° weather (38° of heating) will require furnace output of 44,480 Btu's, (before humidifying), and 3,540 Btu less if heated to 70° (after humidifying).

To heat and evaporate water, however, requires 1120 Btu's per pound of water. The house contains 10,000 cu. ft. or 750 pounds of air. Being weatherstripped, the leakage will not be over ⅜th air change per hr, which is 281 pounds. To raise the humidity by 19.3 grains per pound requires 5,423 grains which is .775 pounds of water per hour, requiring 870 Btu's per hr. to do the evaporating.

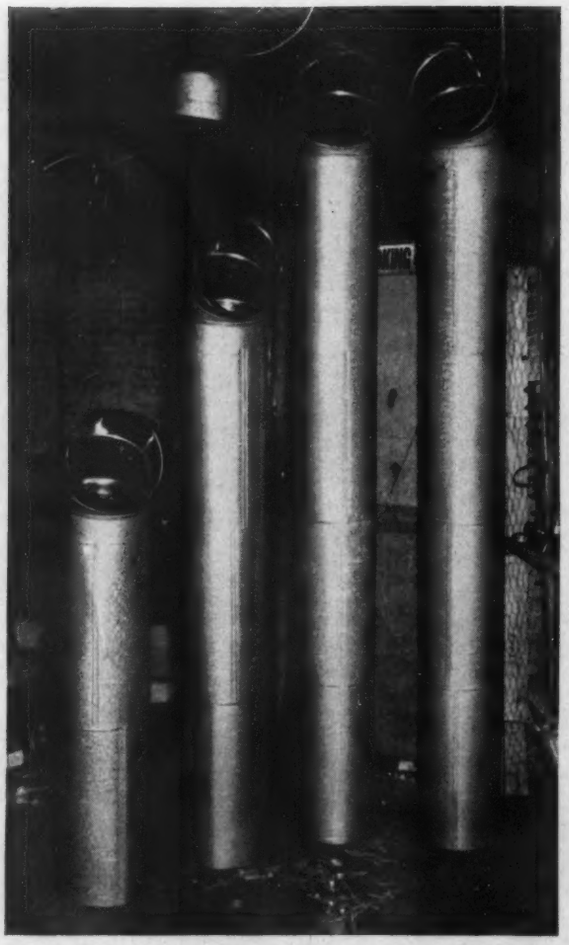
Deducting the 870 Btu's from the 3,540 gross reduction of furnace heat output, we have our net gain of 2,670 Btu's. Our per cent of reduction in heat output will therefore be 2,670/44,840ths or 6%. If all windows are equipped with storm sashes the per cent of reduction in fuel consumption will be the same, but for an unweatherstripped house of average leakage, the fuel saving will be 4½%. The above is very definite and the calculations are sufficiently outlined so that any engineer can check them.

Humidifier Must Have Adequate Capacity

To accomplish the above saving in fuel, the humidifier must have adequate evaporating surface or capacity to raise the humidity by 17½ per cent points with 70° room temperature and the furnace under the intermittent operation or reduced output such as occurs in average winter weather. Where the humidifier has about one-fifth of required capacity the possible saving will be about one-fifth as much.

The water evaporated is so small that its cost can be disregarded. A single dripping faucet can lose several times as much water as is required for the house in the above example.

A shortage of fuel oil is being talked about in 17 eastern states, and various means for economizing on fuel oil are being considered. The 6% saving which humidification would make possible amounts to 3,318,000 barrels of oil per season.



Old tin pipe with paper soaked off and spray painted on the outside (inside still shiny) and spot welded into lengths to be used on job. Welding sections into lengths saves shop crimping and job assembly and makes rigid lengths. Below—Contractor Rummel with his second hand spraying equipment spraying a square G. I. elbow (G. I. sprayed inside and outside). The paint Rummel uses dries to a semi-spangle (name on request).

Pipe "Like New" From Your Scrap Pile

MATERIAL we would normally consign to the scrap pile—old pieces of pipe, fittings, casing tops and casing sections, even sections of a customer's abandoned piping system—can be worked over and used in the present emergency, points out Arthur Rummel in whose shop in South Bend, Indiana, the photographs were taken.

Old Tin or G. I.—Both Are Usable

It doesn't matter particularly what the old material is. If it is papered tin pipe the paper can be removed with soaking and if the tin is rusty and scrappy looking, it can be painted to simulate new galvanized iron. Even old galvanized which has been papered can be cleaned up if a little elbow grease and a stiff steel wire brush is used to get the old paper off. Old metal which has been painted can be repainted if all flaky paint is wire brushed off and if the sound paint surface is brushed to remove dirt, grease, and scratched to provide a bond for the new paint.

Large flat sheets such as furnace casings and tops can be cut up and used to form round or

square pipe if you can get a fair price for your work in order to cover the extra labor involved in working over old material.

Rummel has several times this year been up against the problem of absolutely no iron for rush jobs under way and awaiting completion. All old material he could find around his shop was used. He also bought scrap from his friends in the business. And in one or two especially tough situations went out to South Bend junk yards and bought up old galvanized iron and tin.

Of course, the use of old scrap material just as it comes from the scrap pile is not saleable. Owners do not want and won't buy rusty, scrappy looking metal work, even though they appreciate the seriousness of our problem.

Spot Welding Better Than Re-seaming

Two ideas Rummel has added to his use of scrap material: First, he uses a spot welder to spot weld all seams in round or square pipe. This saves the labor and hazards of straightening out old locks and forming new locks in old material. He straightens out or cuts off the locks but the spot welder requires only lapping and no forming. As one photograph shows, he spot welds sections together in lengths as long as he can handle in the truck or on the job and, thereby, eliminates additional job forming and connecting. The spot welder does in a few minutes the equivalent of several men many minutes forming and locking.

Another Rummel time saver is this bench crimper motorized and geared down to slow revolutions. The set-up will also bead. The spray paint takes the crimping without breaking the paint film.

In revamping an industrial heating system the old ducts were flattened out and re-seamed and re-formed and returned to the job. A very few pounds of new material were needed.

The second idea is painting. Rummel has tried a number of paints which air dry quickly and which spangle, or crackle, or mottle the surface. The reason for this type of paint is that the rough finish hides imperfections in old pipe which would be glaringly evident in any smooth furniture finish.

Paint Must Be "Experimented"

A number of general types and brands of paint have been used, one which puts a finish resembling galvanized iron spangle and which air dries quickly being Rummel's current choice. On tin pipe Rummel paints the outside, but does not paint the inside as the inside usually is pretty bright, but on old galvanized both inside and outside are spray painted so that inside and outside match. Black iron is also painted inside and outside. In all cases the material is formed and welded into the final fitting or section before it is painted. This insures a minimum of handling after painting.

The equipment to spray paint was also picked up used. It consists of the compressor and pressure tank and a fractional hp motor from a furnace fan. Rummel believes that one paint can and nozzle for each color or type of paint saves a great deal of time in washing, cleaning, neutralizing, if there is reason to use more than one kind of color of paint. So he has three or four paint cans and nozzles.

Ventilation is essential for spray painting. A booth is best, but if a booth is too expensive a corner of the shop with cross ventilation from two or more windows plus an old furnace blower, or furnace fan that is lying around will do if the painting is not continuous all day long.

Simplified Extended Plenum

[Defense House Heating]

For the low-cost, defense worker house with a basement, the usual low bid specifies a gravity furnace with round pipes—not too easy to convert to forced air at a later date and not too economical of critical material. This idea of the Peck Furnace Company can be used for gravity; it lends itself readily to later forced air conversion through use of smaller branch round pipe and, highly important, is ideally suited to use of substitute materials for everything but the branches. As for ease of fabrication and erection, the drawings will readily prove the idea's feasibility.

As an economical method of fabricating and erecting duct work in defense type houses, Peck Furnace and Heating Company of Tacoma, Washington, has developed the ingenious trunk line shown in the drawings. The idea is so practicable, however, that use is not restricted to small houses, but has been applied successfully in large houses and public buildings.

According to the heat loss of the building, one of three sizes of duct is selected, depending on air volume. As shown these sizes are based on economical use of a 32, 36 or 42-inch wide sheet. Three pieces make a section—the top and sides in one sheet, the bottom in the second, the dividing partition is the third.

To fabricate, the top and sides are braked as shown with a loose double lock turned up along each edge. The bottom is flanged up to slip into the top's fold. The partition is flanged along both edges, flanges opposing.

Further to simplify the job, one size of round pipe is used for branches—7 inches. A damper is placed in the 45-degree elbow section.

Wherever possible the furnace is located so the main runs across joists so that the branches run between joists to save head room.

Erection Procedure

Erection is just as simple as the fabrication. The top pieces are nested for delivery and the bottoms and partitions stacked in the truck. On the job, the main is spotted across the joists and the mechanic begins by taking the 8-foot sections of top and nailing the section to the joists in two rows of nails toward the outside of the flat top.

Then the holes in the sloping faces are cut for the branches and the elbow section which has been crimped and beaded is shoved into the hole. The crimp makes a tight fit; the bead keeps the elbow from being shoved in too far.

Next the mechanic puts the partition in place and nails the top flange to the joists through the top sheet. To finish the section, the bottom is slipped into the lock and pushed into place. Then metal screws are run through the bottom sheet into the partition flange and the section is complete.

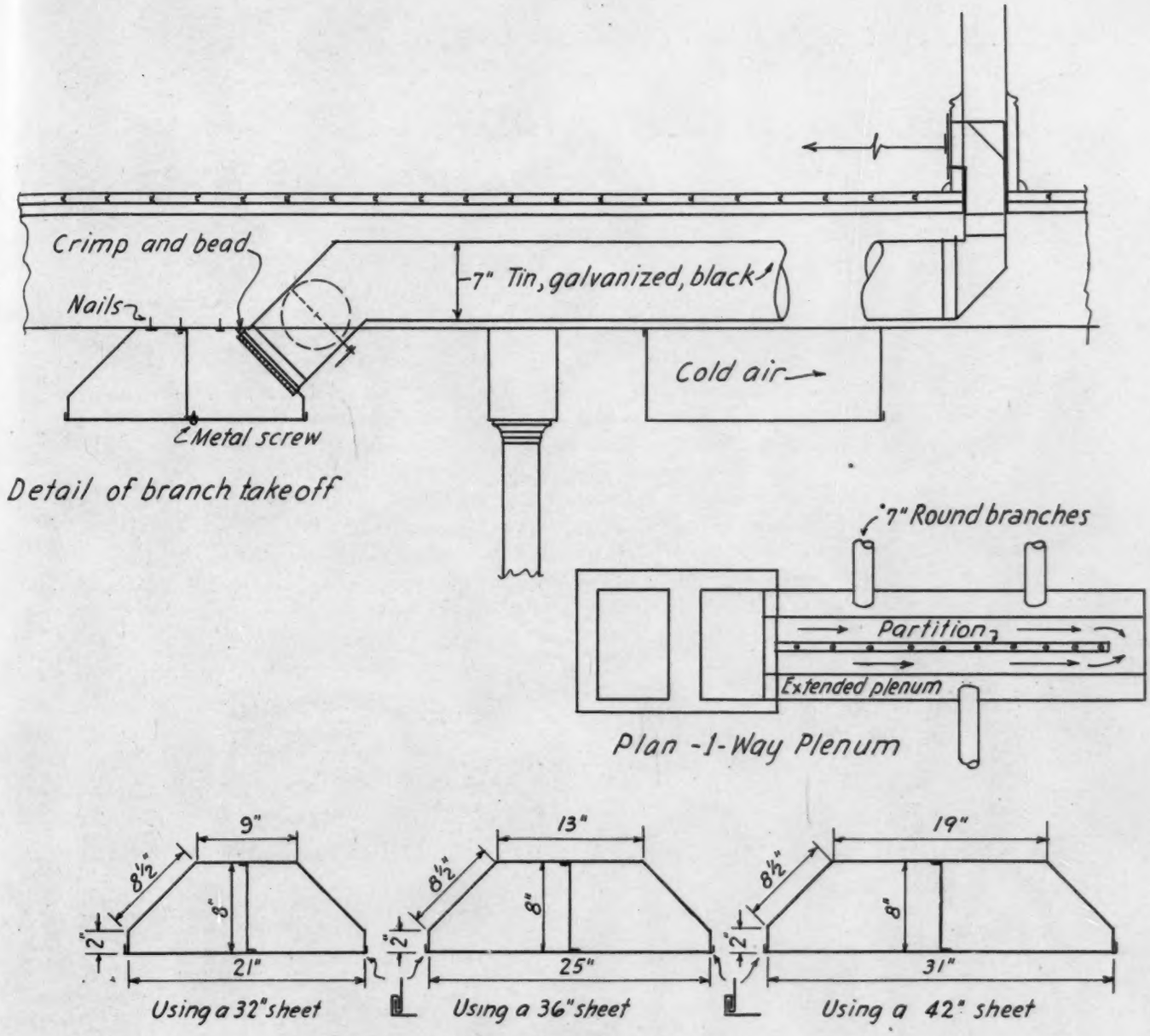
Usual Drive Cleat Connection

Sections are joined together with drive cleats. Partitions are joined together with simple S slip cleats.

Sections may be made in 8-foot lengths and cut to size on the job, or shorter lengths can be made if the final length of the main is known before delivery.

Trunk Dimensions Are Not Critical

In mains of this type, dimensions are not critical—size does not have to be and is not held to fractions of an inch or even to inches. There are no transitions, no take offs, no fittings. No fitting has to be done in the shop since the holes for branches are spotted on the job and the cutting of the round hole is simple. Neither is velocity or resistance critical—the resistance in the main is low because the mains are generous in size and there are no fittings. Resistance over the whole piping system is pretty much the total of the resistance at the register face, plus resistance at the register box, plus resistance due to entrance loss



Details of Extended Plenum Construction

from main to branch.

Velocity is not critical because air flows out from the plenum along both sides of the partition and around the end so that velocity equalizes itself. Theoretically there is some point in such a main where velocity is nil and this point need not be at the end of the partition but can be somewhere along the side having the fewest branches.

Cost Lower Than Usual Trunk

As to cost, the simplicity of the main indicates how little shop time is required while for erection in the field the usual 60,000 Btu heat loss, one-story house, with one main run requires one man 8 hours to put in register boxes, registers, branches, main, connect to casing and balance the job. Incidently, on this system, balancing is negligible—the system can hardly be put out of balance no matter how much juggling is done with the dampers.

While the plan shows the main run in one direction only from the furnace, it is equally possible to run the mains two or more ways—each main being smaller in size, of course. Peck has systems with 14-inch wide mains working just as well as wider ones.

Small House Builders Like Idea

Peck has been installing these duct systems for some time. In the Tacoma area where small, low-cost houses are under construction for war workers, this type of duct is very much in line with builders' ideas of low-cost heating. If necessary, the same idea can be used with any of the substitute materials we are being asked to use in place of metal sheets.

Government Itself has proved that

Circulating Heaters Can't Provide Comfort

Our industry has been profoundly disturbed this year by the tendency of some Federal housing agencies to insist that war worker housing can be satisfactorily heated by circulating heaters and stoves. We have tried to prove that room-to-room temperatures vary widely; that floor-to-ceiling temperature differences are extreme and that a forced warm air system overcomes these faults at no increase in operating cost and at little additional installation cost. That we have sound ground for so arguing is proved by one of Washingon's earliest housing experimenters—Tennessee Valley Authority—which tested all kinds of heating plants and recorded their findings in a report "Studies in the Heating of Small Houses" issued in 1939. This article, and two articles to follow, are taken verbatim from that report. We surmise that the present type of PB-18 Defense House Furnace originated from these tests.

THE art of heating has progressed rather rapidly during the past several years. A public consciousness has developed on such thermal factors as uniformity of temperature within rooms, air changes, relative humidity, and air cleanliness. Manufacturers have met this consciousness by producing equipment not only with efficient thermal characteristics and low operating costs but with operating procedures as nearly automatic as has been found possible. However, regardless of the desirability of this equipment, relatively high capital costs eliminate any consideration of its use for low-cost housing.

Local heat sources, such as fireplaces and free-standing stoves, have been redesigned in order that they may provide effective heat by convection as well as by radiation. The capital cost of this equipment is consistent with the costs of low-cost housing. Yet, even with these improvements in the application of a basic heat source, it is still possible to heat successfully only one unit of space or room rather than an entire house with these methods.

The Tennessee Valley Authority, in its building of houses for construction camp villages, has made many studies of the comforts and conveniences necessarily contained in low-cost housing. Often family income, because it affects rentals, and short periods of amortization for the cost of temporary houses, because they affect capital costs, have prevented the incorporation of any one of the accepted better heating methods within certain of the Authority's houses.

Working on the principle of uniform air heating, not within any one single room but within an entire house, the Authority has made trial-and-error studies. Forced circulation by means of fans was tried in connection with the fireplace furnace. Grilles were placed in first floor ceilings in an attempt to heat entire houses with a circulating heater. Houses were planned, at the expense of privacy within the household, with as few room divisions as possible in order that a single circulating heater in any one room might heat the entire living space.

The results of these experiments are only fairly satisfactory. Inevitably, rooms containing the heat source were overheated when any attempt was made to heat an entire house adequately. Recent studies conducted at the Hiwassee Dam construction village showed that, in houses planned for and heated by circulating heaters, living rooms, containing the heater, were heated to average temperatures of 90° when any attempt was made to heat adequately other rooms in the house. Temperatures in these living rooms varied as much as 25° from floor to ceiling.

Project Description

At the beginning of the Gilbertsville Dam project, the use of a simplified central house heating installation was contemplated for the Gilbertsville Dam construction community. Preliminary designs of this installation were made and incorporated in the plans of Gilbertsville House Type AA (Plate 2).

As a forerunner of actual construction, one of the Type AA houses was completed in early February, 1939, having been built at this time in order that heating studies might be made before warm weather set in. This house contains four rooms and bath and is constructed as follows:

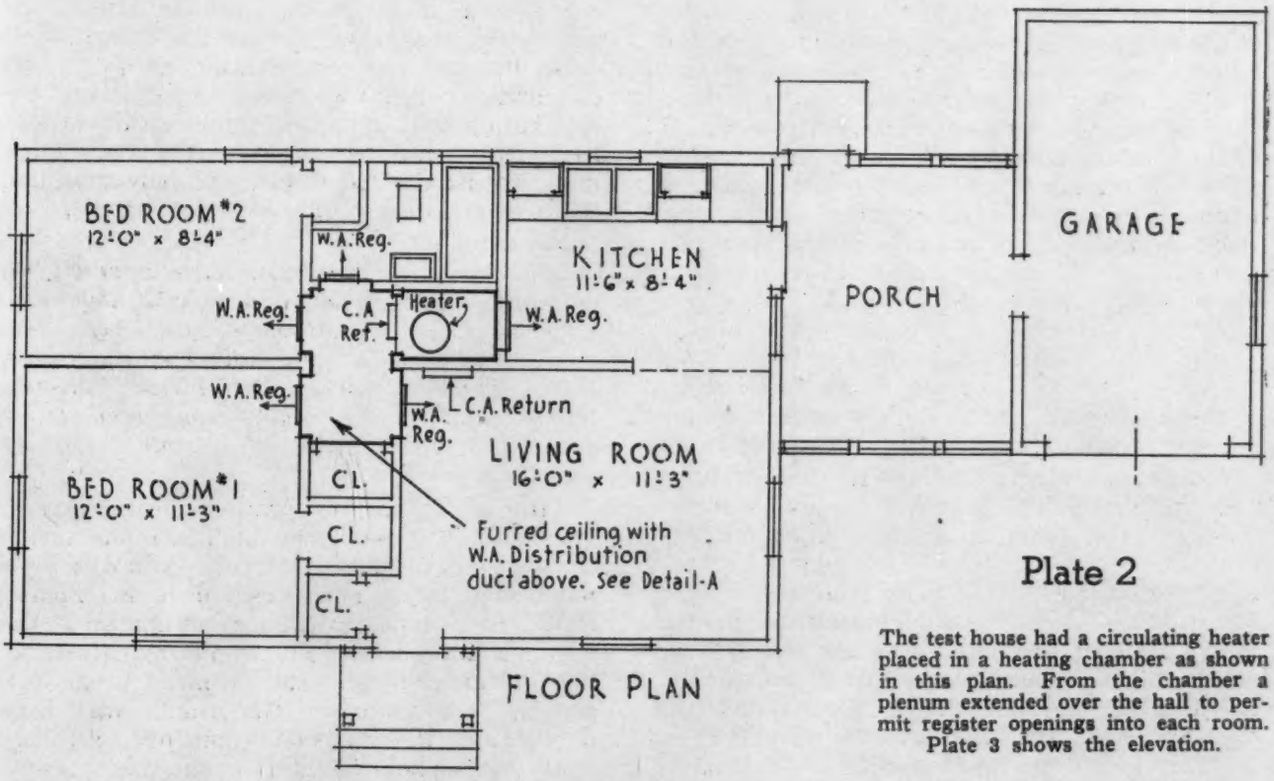


Plate 2

The test house had a circulating heater placed in a heating chamber as shown in this plan. From the chamber a plenum extended over the hall to permit register openings into each room. Plate 3 shows the elevation.

Walls—½" weatherproof insulation board exterior facing on 2"x4" studs with ¼" plywood interior facing. In the center of the voids between studs was placed an air-cell insulation approximately 1" thick. This insulation consists of 10 layers of corrugated paper and depends upon the resulting dead-air spaces for its insulation value.

Floors—¾" gum finish flooring placed over ¾" insulation board subflooring.

Ceilings—½" insulation board with 3⅝" insulating wool between ceiling joists.

Roof—29 gauge, lock-joint, V-crimp galvanized iron roofing laid over felt on solid wool sheathing.

Windows—D. H. except in kitchen and bath. All wood.

Foundation—Cinder block piers with a $\frac{3}{16}$" asbestos board facing to 6" below grade.

Computed heat transmission coefficients for the structure are:

Wall—0.128 B.T.U/hr./sq. ft./deg. F.

Floor—0.25 B.T.U./hr./sq. ft./deg. F.

Ceiling—0.066 B.T.U./hr./sq. ft./deg. F.

The Type AA house was so planned that warm air from a small heating chamber (Plates 2 and 3) approximately 3'x3½' would be available to all rooms, to some from the chamber and to others by way of a furred duct space over a small, centrally located hall. Air was suppled to the rooms by ceiling registers and returned to the heater by two grilles at the base of the heating chamber, one located in the living room and one in the hall. As an alternative, in case the return grilles at the base of the heating chamber did not afford proper distribution of air within the room, ducts were placed under the floor with return registers in the exterior corners of the living room and both bedrooms.

The heater was of the circulating heater type, bought on the open market. This heater consisted of a combustion shell within an outer enameled jacket and was primarily designed for use directly within a room. The particular heater chosen for this study was fired with fuel oil since efficiencies of both the heater and the house construction were discernible with the test equipment at hand only by the use of a fuel that could be readily measured and whose B.T.U. content could be evaluated. Oil was supplied to the heater through a constant-level valve fed by an outside, fifty-gallon reservoir. The installation was so designed that the quantity of oil fed to the heater could be controlled either by a manually operated needle valve or by a thermostat, which through a transformer, actuated a bimetallic element within the constant-level valve and alternated the feed of oil between predetermined high and low settings. The heater was placed within the heating chamber upon supports just above the return grilles. The thermostat was placed in the living room but wired with an extension which allowed it to be placed at various points and at different levels within the room.

Recording thermometers, recording the temperature of remote sensitive bulbs, were used in order that a continuous moving average of temperatures might be recorded and studied. Except as otherwise noted in this report, the sensitive bulbs were placed 40 inches above the floor. The temperature at this level represents a fair average of the temperatures controlling the heat loss from the body of a person seated or standing. Air movement across floors was measured with

a kata thermometer. Volumetric measurements of air delivered to the rooms and returned to the heater were taken with a vane anemometer. Circulation within rooms was generally noted by observation of the paths of travel of smoke manufactured at any particular point. Relative humidity was determined by the use of a hand aspirated psychrometer. The radiant effect of the surrounding walls, floor, and ceiling was measured in mean black body radiant temperature by a Vernon globe thermometer.

Gravity Circulation

The heater, gravity feed type, was fired for the first time on February 12.

It was soon discovered that the temperatures were sufficiently high within the heater chamber to prevent the functioning of the bimetallic element in the constant-level valve mounted on the back of the heater. (See Plate 3 for heater room construction.) Since the temperature in the heater chamber was higher than the temperature at which this element would contract and regulate the feed through the valve, it prohibited the operation of the heater with the thermostat. Preliminary tests were made during two days with the fire in the heater controlled by manual operation of the needle valve.

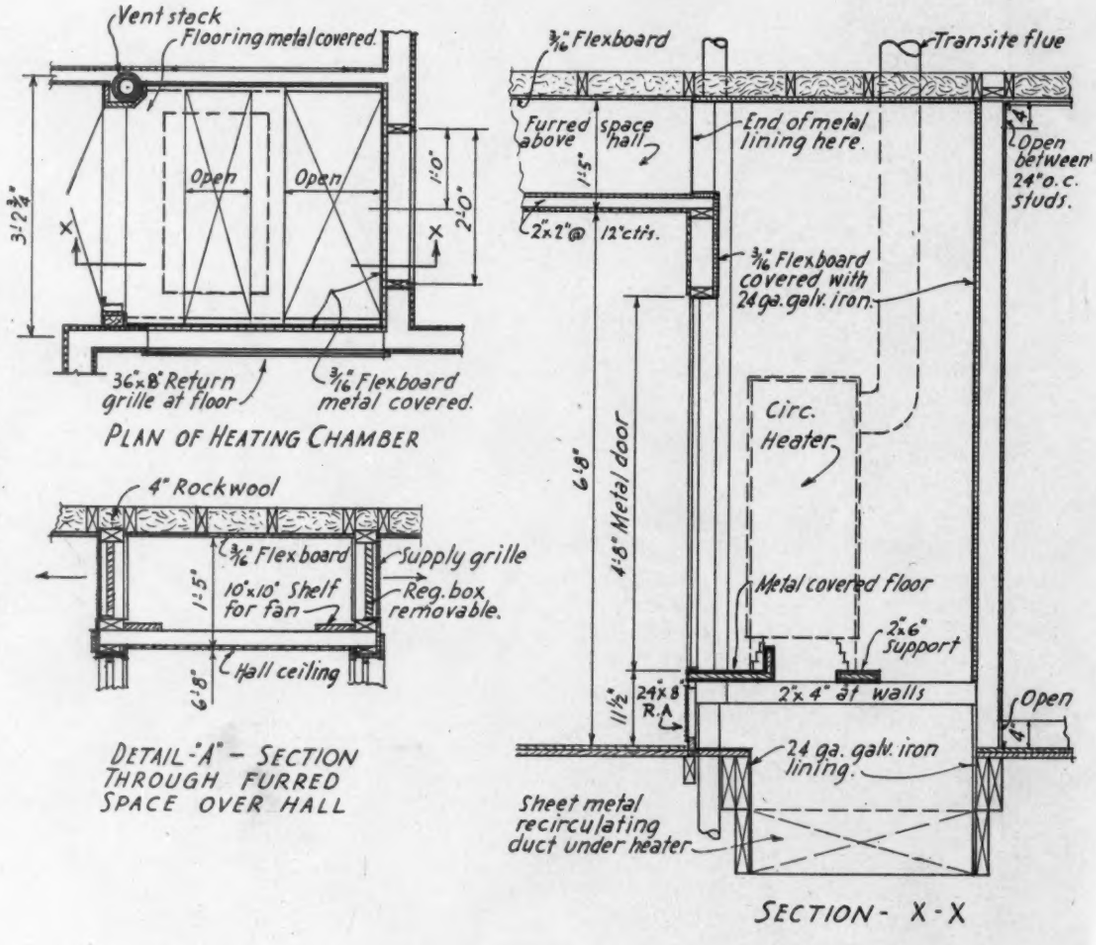
Brief studies of the installation, first with the use of the return grilles at the base of the heater chamber and then with the alternate return ducts under the floor, showed that the return ducts under the floor were not necessary for proper air distribution within the rooms. Operation of the installation with both the return grilles at the base of the heating chamber and the return ducts under the floor in use did give an indication that the area of either of the two might well be increased.

(Editor's note: These tests were probably the first proof we have that in very small houses an elaborate return air system—returns from every room; returns at outside walls; extensive duct work—is not necessary. Note in text following ceiling-to-floor and room-to-room temperature uniformity obtained with two returns plus forced air circulation.)

After preliminary observations on the heating installation had been made, the heater was turned off and the constant-level valve removed from the heater jacket and placed upon the kitchen wall. (By a simple adjustment not known at this time but later pointed out by the manufacturer, the bimetallic element can be made to contract at high temperatures.) The heater was again lighted and the thermostat put into operation after the bimetallic element in the constant-level valve had been adjusted for the high and low fire desired. The thermostat was set to maintain a temperature of 70° at 40 inches above the floor, and the house was allowed to heat overnight in

Plate 3

The heating chamber is also the heater casing and was constructed with metal lined insulating board walls. Section X-X shows the supplementary ducted return airs which did not improve circulation and were therefore abandoned for the two returns shown in Plate 2.



order that heat losses might come to an equilibrium.

It was assumed that equilibrium had been reached at 4 p. m., February 15, and during the following 24-hour period air distribution with related thermal factors and fuel consumption were checked. The average temperature at 40 inches above the floor for the various rooms were 69.8°, 69.5°, 66.9° and 68.9°, which gave an average for the entire house of 68.8°. The difference in temperatures at 6 inches and at 40 inches above the floor averaged 3.7°; the difference in temperatures at 40 inches and at 60 inches above the floor was approximately 3.0°. Temperatures 6 inches below the ceilings, which were 8 feet high, averaged 82.8° and led to the observation that a layer of high temperature air was pocketed under the ceiling at all times. This condition, produced by gravity circulation with air delivered to the rooms at a temperature of apprximately 115° and returned to the heater at 67.5°, appeared to represent a waste of heat. The mean black body radiant temperature of the living room boundaries was 72.5°.

Smoke test observations showed a fairly good horizontal distribution of air in the lower levels of the rooms. Movements of air across floors averaged 8 feet per minute. Relative humidity was approximately 20. Outside air temperature during the 24-hour period averaged 34.3°, and the total oil consumption was 7½ gallons, or 0.0091 gallons per degree hour.

Heat loss computations for this house gave an expected heat loss per degree hour of 565 B.T.U. The heater had a manufacturer's rating of 70 per cent efficiency for use in an open room, and as installed an efficiency of 65 per cent was expected. The consumption of 0.0091 gallons of No. 2 fuel oil at a rating of 140,000 B.T.U. per gallon gives 1274 B.T.U., which indicates that the heater, with operating conditions as just described, was only approximately 45 per cent efficient.

The conclusion drawn from this test is, not that the efficiency of the heater is actually as low as 45 per cent, but that the layer of high temperature air at the ceiling produced a heat loss for the house far in excess of that computed. It seems apparent, therefore, that operating this heater by gravity circulation, as in this test, is economically unsound.

Forced Circulation

In order to create forced circulation for testing purposes, an 8-inch desk fan was placed behind the register supplying each room. These fans were turned on and ran continuously during a 24-hour test beginning at 4 p. m., February 16. The heater was thermostatically controlled as in the previous test. During this period the average temperature readings at 40 inches above the floor for the various rooms were 72.0°, 73.1°, 71.2°, and 72.5°, which gave an average for the entire house of 72.1°. The difference in temperatures at 6 inches and at 40 inches above the floor averaged 6.2°. The difference in temperatures at 40 inches and at 60 inches above the floor was approximately 3.0°. Temperatures 6 inches below the ceiling averaged 79°. Air was delivered to the rooms at an average temperature of 87.5° and returned to the heater at 68.8°.

(*Editor's note: Don't pooh, pooh this use of desk fans. Remember this whole investigation was before we had any PB-18 furnaces. Read further and study the better results obtained when a true pressure type fan was used.*)

These temperatures indicated that, although the circulation of the air was better than with gravity circulation, increased circulation of air was needed. Measurements of quantities of air delivered to and returned from the rooms substantiated this indication. These measurements showed an apparent delivery of 600 cubic feet per minute of warm air to the entire house, but a return to the heater chamber of only 300 cubic feet of air per minute. This difference and the fact that the anemometer recorded several negative readings across the face of the supply registers showed the air, rather than being entirely drawn through the heater chamber, was being partially churned within the furred duct over the hall. The reason for this condition is the fact that the fans used would not work against even the slightest pressure because of their design and because the fan blades did not cover the supply openings.

Horizontal distribution of air in the lower levels of the rooms was much improved over that observed during the previous test of gravity circulation. Air movements across floors apparently were lower than those within the accuracy range of the kata thermometers. During this 24-hour test the oil consumption was 4 gallons. This oil consumption, with an average outside temperature of 46.3°, shows an operating efficiency for the heater of approximately 62 per cent.

Fan-in-Casing Studies

An attempt was made to increase the circulation of air through the heater chamber by removing the fans from behind the supply registers and placing all five in the return area under the heater, blowing up. The return grilles were removed to decrease the resistance of air flow. The fans were turned on and a test began at 5 p. m. on February 17. No improvement in circulation by this location of the fans was noted, and the fans were returned to their position behind the supply registers at 2 p. m., February 8.

Two very significant observations were made during this period. First, it was noted that it might be possible to place a fan of the centrifugal blower type under the heater without impairing combustion. The fire within the heater was observed from time to time during the test, and it was observed that air of comparatively high velocity directed against the intake air holes under the heater had little or no effect upon com-

bustion. Second, it was noted that the house began to overheat, with the heater operating at low fire, when the outside air temperature rose to 50° and above. This latter observation was an indication that the heater installed was too large.

The supply registers as well as the return grilles were removed in order to study the circulation of air through the heater chamber when resistance to the air flow was at a minimum. It was found that circulation was definitely improved by this procedure. The difference in temperatures at 6 inches and at 40 inches above the floor averaged 5.0°; between 40 inches and 60 inches above the floor it was approximately 1.8°.

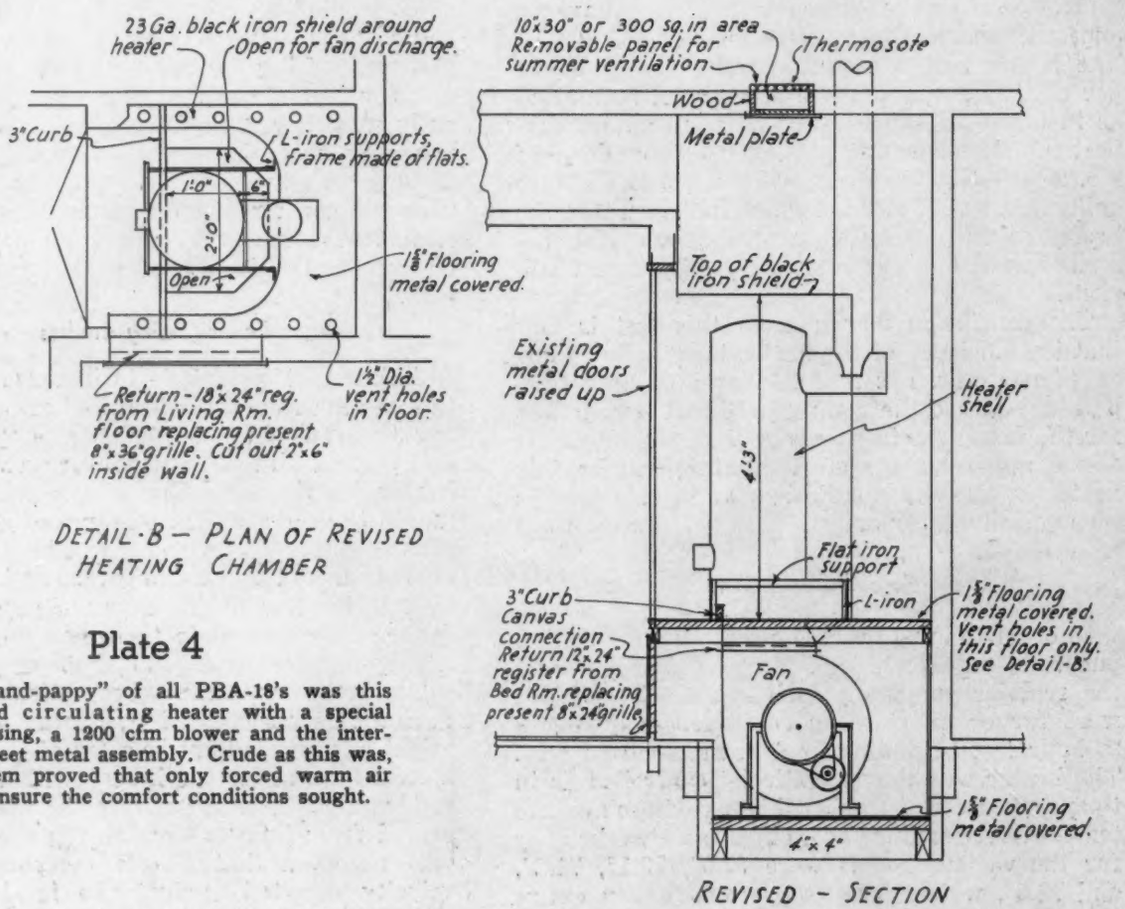
A test made from 5 p. m., February 18, to 11:30 a. m., February 19, in spite of very high wind, showed the highest efficiency for the heater recorded during the entire study, 93 per cent. The outside temperatures were relatively high during this period, averaging 57.4°, and the house was overheated, with an average temperatureof 77.0°. Similar tests, which continued until 3 p. m. on February 23, showed an average efficiency for the heater of 65 per cent. During these tests the average temperature at 6 inches above the floor was about 65.0°, at 40 inches above the floor 70.0°, and at 6 inches below the ceiling 77.0°. Air was supplied to the rooms at an average temperature of 85.0° with the heater operating at low fire and at 95.0° with the heater operating at high fire. Relative humidity was approximately 35. The mean black body radiant temperature of the living room boundaries ranged from 70° to 72°. Air movements across the floor were negligible as regards comfort. The average outside air temperature for the period was 29.3°. It appeared that the low temperature at 6 inches above the floor would be raised by a greater flow of air through the heater chamber than that afforded by the small fans.

Fire Hazards

Although every effort had been made during the assemblage of the heating installation to prevent the existence of any fire hazard, the installation was closely observed from this viewpoint during the entire testing period. The interior of the heater chamber and the furred duct over the hall were lined with asbestos board. In the chamber the asbestos board was metal covered. Observations showed that, during periods of high firing, the walls of the heater room were only moderately warm and during periods of low firing, very cool. Air temperatures 6 inches above the heater during periods of both gravity and forced circulation ranged from 110° to 150°. The partition adjacent to the smokepipe was ventilated on the kitchen side by openings at the floor and ceiling.

(*Editor's note: We think the above paragraph is particularly interesting because it has recently been suggested that material for casings might be*

(*Continued on page* 93)


23 Ga. black iron shield around heater
Open for fan discharge.
3" Curb
L-iron supports, frame made of flats.
1'-0"
6"
2'-0"
Open
1⅝" Flooring metal covered.
1½" Dia. vent holes in floor.
Return - 18"x24" reg. from Living Rm. floor replacing present 8"x36" grille. Cut out 2"x6" inside wall.
10"x30" or 300 sq. in area Removable panel for summer ventilation
Thermostate
Wood
Metal plate
Top of black iron shield
Existing metal doors raised up
Heater shell
4'-3"
Flat iron support
L-iron
3" Curb
Canvas connection
Return 12"x24" register from Bed Rm. replacing present 8"x24" grille
Fan
1⅝" Flooring metal covered. Vent holes in this floor only. See Detail-B.
1⅝" Flooring metal covered.
4"x4"

DETAIL-B — PLAN OF REVISED HEATING CHAMBER

REVISED - SECTION

Plate 4

The "grand-pappy" of all PBA-18's was this assembled circulating heater with a special metal casing, a 1200 cfm blower and the interesting sheet metal assembly. Crude as this was, the system proved that only forced warm air could insure the comfort conditions sought.

AMERICAN ARTISAN

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Pattern Development for

Heavy Gauge Blow Pipe Fittings*

Tapered Transformer Pieces

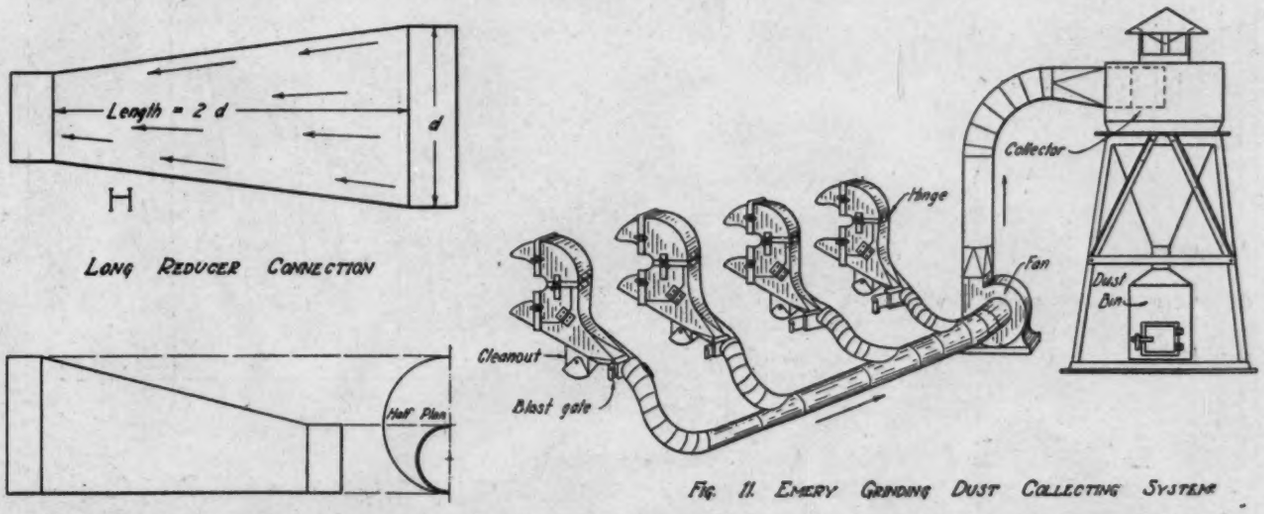
By William Neubecker

THIS second article will cover the pattern developments for transformer pipe connections, as shown on plate No. 9, diagrams H and I, in the book "Standard Practice in Sheet Metal Work." These taper pieces known as reducers or increasers are used in dust collecting systems as illustrated on Plate No. 3, Fig. 11, in the above mentioned book.

Diagram H on plate No. 9 presents a problem in radial line development of the frustum of a right cone. When the frustum has little flare and a center point cannot be used, owing to the length of the radius that would be required, a simple but accurate method can be employed in developing the pattern shape as will be explained.

In this type of development and others which will follow, always bear in mind when obtaining the stretchout for the pattern shapes, to always use the neutral or mean diameters. This will give a result that takes care of the allowance that must be made for rolling the metal sheets when the transformers or taper pieces are made up, because the neutral diameter remains practically fixed.

As an example assume that the two transformer pipe connections H and I on plate No. 9 will be made up from No. 16 gauge metal, which is $\frac{1}{16}$ inch in thickness, and that the inside diameter at the large end is to be 15 inches and the inside diameter at the small end to be 8 inches. To find the neutral diameters at both ends using $\frac{1}{16}$ inch thick metal, we have $15 + \frac{1}{32} + \frac{1}{32} = 15\frac{1}{16}$ for the large end and $8 + \frac{1}{32} + \frac{1}{32} = 8\frac{1}{16}$ for the small end. This is made clear in connection with Fig. 8 in the accompanying illustration, where the inside, neutral and outside diameters are shown. The outside diameters in this problem would be $15\frac{1}{8}$ inches at the large end, and $8\frac{1}{8}$ inches at the small end.



Diagrams H and I from Plate 9 and Fig. 11 from Plate 3, Standard Practice in Sheet Metal Work, show typical reducers and increasers in a dust collecting system where wheel hoods in parallel are connected in the main line of the collector.

Pattern for Center Reducer

Now refer to Fig 9 where *A-B-C-D* shows a stream line elevation of the frustum of a right cone. On both the large and small ends, the semi-neutral sections are drawn and the quadrants at both ends divided into three divisions as shown. Use more division on a full size layout, or as many, as there are to be rivets in the cross joints. That is all that is required previous to laying out the pattern shape.

Now take the length of the flare *A-B* and set

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DEVELOPING PATTERNS FOR HEAVY GAUGE — TRANSFORMER PIPE CONNECTIONS -*-

FIG. 8

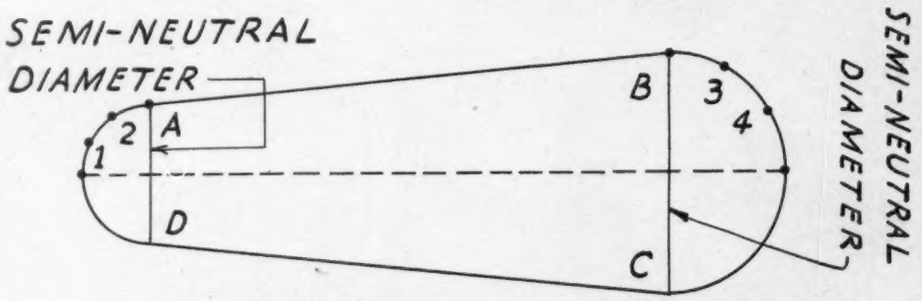
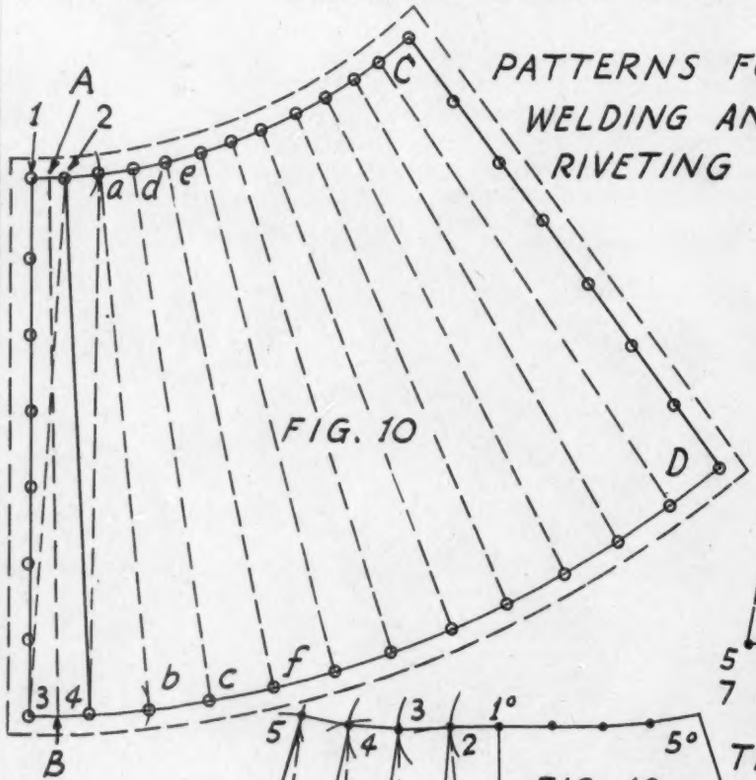


FIG. 9 STREAMLINE ELEVATION OF A RIGHT TAPER PIECE WITH SEMI-NEUTRAL DIAMETERS



PATTERNS FOR WELDING AND RIVETING

FIG. 10

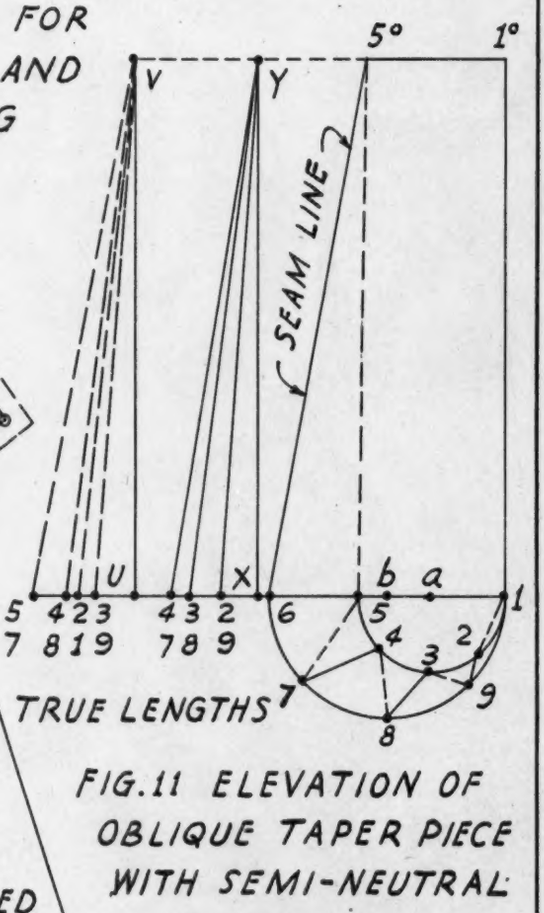


FIG. 11 ELEVATION OF OBLIQUE TAPER PIECE WITH SEMI-NEUTRAL SECTIONS IN PROPER POSITION FOR LAY-OUT PATTERN

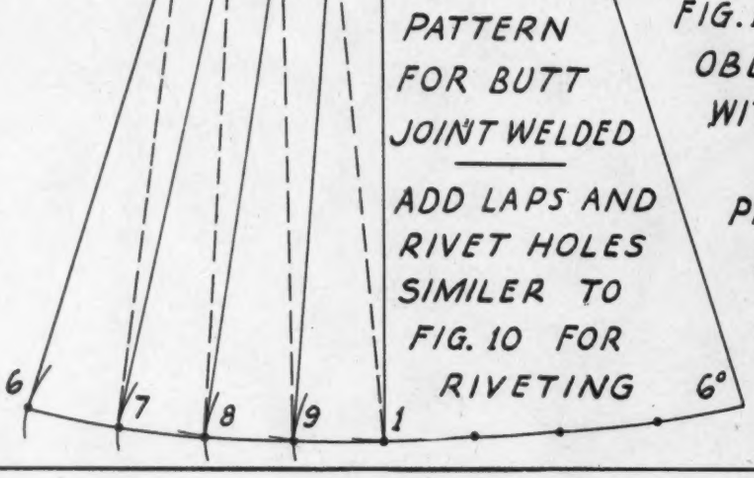


FIG. 12 PATTERN FOR BUTT JOINT WELDED

ADD LAPS AND RIVET HOLES SIMILER TO FIG. 10 FOR RIVETING

* ALL RIGHTS RESERVED - BY- W. N. -

it off on the vertical line in Fig. 10 as shown by *A-B*. Take one-half of the division *1-2* in the semi-neutral section of the small end in Fig. 9 and set it off in Fig. 10 on either side from the point *A*, at right angles to *A-B* as shown by *A-1* and *A-2*. In a similar manner, take one-half of the division *3-4* in the semi-neutral section of the large end in Fig. 9 and set it off in Fig. 10 on either side from the point *B* at right angles to *A-B*, as shown by *B-3* and *B-4*. Draw lines from *1* to *3* and *2* to *4*. Then will *1-2-3-4* be the one-twelfth pattern shape.

To complete the full pattern proceed as follows: With point *n* as center and *2-1* as radius strike a short arc near *a* and intersect it by an arc struck from *4* as center, with a radius equal to *3-2*. Now with a radius equal to *3-4* and with *4* as center, strike a short arc near *h* and intersect it by an arc struck from *a* as center with *2-4* as radius. Proceed in this manner until twelve of the shape shown by *1-2-3-4* have been joined together. Through these points of intersections trace the curve *1-C* and *3-D*. Then will the solid outline *1-C-D-3* be the full pattern shape for butt joint welding.

If riveted construction is desired use the intersection points *a-d-e*, etc., along the curve *1-C* and the intersection points *b-c-f*, etc., along the curve *D-3*, for punching the rivet holes. Also space rivet holes along the side seams *1-3* and *C-D* and allow laps all around the full pattern shape as shown.

Again refer to Plate No. 3, Fig. 11, "Standard Practice in Sheet Metal Work," and note the direction of the air flow, which indicates in what direction the parallel pipes must lap, connect and be riveted to the increasers.

Pattern for Off-Center Reducer

The reducer or increaser shown in Diagram I on Plate No. 9 in the "Standard Practice" book, has a level bottom and presents a problem on developing the frustum of a scalene or oblique cone, an enlargement of which, is shown in elevation, in a vertical position in Fig. 11 and in accompanying illustration. This problem will require triangulation for its solution.

Draw the *neutral* outline of the oblique taper piece as shown by *5°-1°-1-6*. On the line *1-6* draw the semi-neutral section of the large end using *b* as a center. Now take the distance *1°-5°* at the small end and set it off on the line *1-6* as shown by *1-5*, which bisect and obtain the center *a*. With *a-1* as radius describe the semi-neutral section of the small end.

To avoid a confusion of lines in so small a drawing, the semi-neutral sections have been spaced into four divisions each, as shown from *1* to *5* for the small end and from *6* to *1* for the large end. In practical work these divisions are made to equal the number of rivets to be placed along the cross seams.

Now connect the various divisions in the semi-neutral sections of the small and large ends as shown by solid lines from *4* to *7*, *3* to *8* and *2* to *9*; also dotted lines from *5* to *7*, *4* to *8*, *3* to *9* and *2* to *1*. These lines then represent the base lines of triangles to be costructed, whose altitude will be equal to the length of the level line *1-1°*. Extend the line *1-6* in elevation indefinitely to the left as shown. Establish any two points on it, as *X* and *U*, from which erect perpendicular lines equal to the level length of the taper as shown by *X-Y* and *U-V*.

Now take the lengths of the solid lines in the semi-neutral sections as *4-7*, *3-8* and *2-9* and place them on the line *1-6* extended, measuring in each instance from the point *X* and obtain similar numbered intersections as shown, from which solid lines are drawn to the apex *Y*. These lines will be the true lengths of similar numbered solid lines in the semi-neutral diameters.

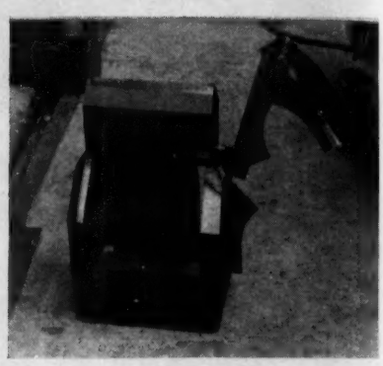
In a similar manner take the various lengths of the dotted lines in the semi-neutral sections as *5-7*, *4-8*, *3-9* and *2-1* and place them on the line *1-6* extended, measuring in each instance from point *U* and in this manner obtain similar numbered points as shown, from which dotted lines are drawn to the apex *V*. These lines will be the true lengths of similar numbered dotted lines in the semi-neutral sections.

Final Pattern Development

The pattern shape can now be developed as follows: As the seam line should be placed at the top or flaring side, start with the distance of *1-1°* in elevation and place it as shown by *1-1°* in Fig. 12. With a radius equal to *1-2* in the semi-neutral section of the small end in Fig. 11 and using *1°* in Fig. 12 as center, describe a short arc near *2*, which intersects by an arc struck from *1* as center, with a radius equal to the true length of the dotted line *2-1* in Fig. 11. Now take a radius equal to *1-9* in the semi-neutral section of the large end and using *1* in Fig. 12 as center, describe a short arc near *9* which intersects by an arc struck from *2* as center, with a radius equal to the true length of the solid line *2-9* in Fig. 11.

Proceed in this manner using alternately, first the proper numbered division in the semi-neutral section of the small end, then the proper numbered true length of the dotted line; the proper numbered division in the semi-neutral section of the large end, then the proper numbered true length of the solid line, until the intersections *2* to *5* and *9* to *6* in the pattern shape in Fig. 12 are obtained. Now trace the curved lines in the pattern from *1°* to *5* and *1* to *6* to complete the one-half net neutral pattern shape. Duplicate this one-half pattern opposite the line *1°-1* as shown by *5°-6°*. Then will *5-5°-6°-6* be the full pattern shape, for butt joint welding.

If the increaser is to be of riveted construction, use the intersecting points shown by the small dots for rivet holes and add laps all around, the same as was done in connection with the right cone pattern in Fig. 10.



Industrial Metal Fabricators' new office and shop was built and equipped for metal specialty manufacture. Left—Photo 9 shows two types of hoods currently in production. Right — Photo 12 — A very complicated hood with 3 hinged covers of unusual complexity. Note intricate contours required to fit housings to machines.

Sheet Metal Machine Tool Housings

ONE of the important developments to come out of the present emergency is the substitution by machine tool builders of heavy gauge sheet metal housings to replace former cast iron housings covering gears, moving parts and directing cooling agents to the work in the machine.

Latest development of the three uses of housings is the last—the directing of the cooling agent to the work in the machine. Because machine tools today must work to close tolerance and because the machine must operate at maximum speed, it is vitally necessary that liquid or air be used to cool the cutting tool. The housing keeps the air stream or the liquid directly on the work and, in the case of liquid, prevents waste of coolant and provides means for gathering the liquid for constant recirculation.

Sheet Metal Saves Weight

Also important is the fact that substitution of sheet metal for castings reduces the weight of the machine and permits foundry and machine shop facilities to be used to make vital parts of the machine. At the same time, this automatically places in the shop of the properly equipped sheet metal fabricator a variety of heavy gauge parts which can be fabricated by sheet metal machinery.

In the Detroit area, where a wide variety of machine tool equipment is manufactured, Industrial Metal Fabricators, Ltd., at the very beginning of the war period visualized this trend and set up shop equipment in such a way that any type or size or gauge of housing can be placed in assembly line production.

Having a thorough understanding of the wide variety of sizes, shapes, gauges to be worked, Industrial incorporated in their production line

Photo 1—After shearing to size, the single piece sides and back of a housing is torch cut to shape using a template. Industrial finds torch cutting to be as satisfactory as nibbling on these large pieces.

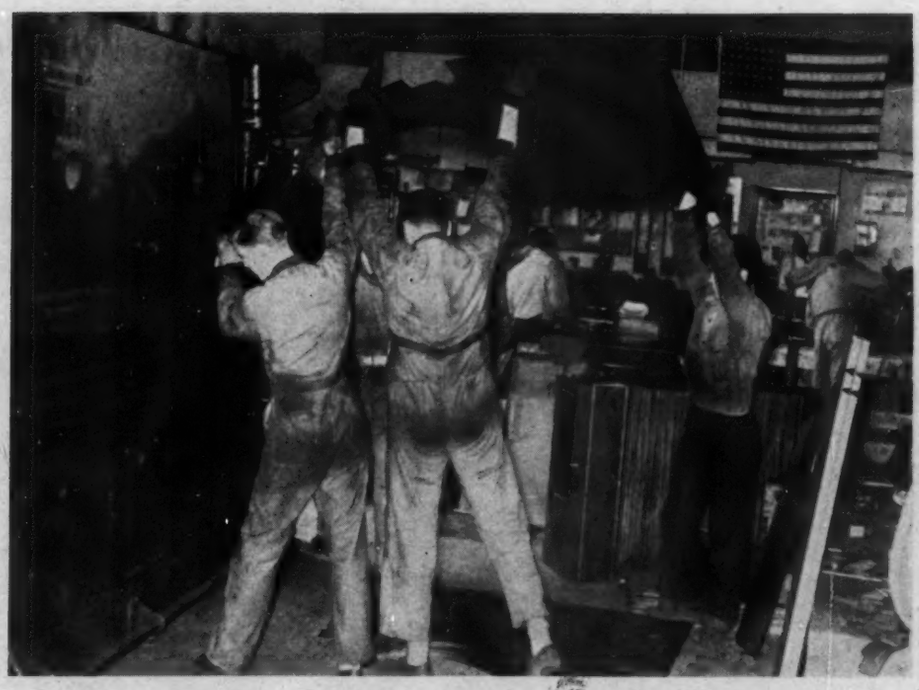


Photo 4—After the sides and back piece has been torch cut, a die set up in a large press forms the bottom flanges. The four-man crew handles the large and flexible piece cheaper than a smaller crew might handle several smaller pieces. Note ample floor area along the production line.

sufficient flexibility so that machines can be taken out of the line; or machines can be added; each machine having sufficient working floor space so that the largest sub-assemblies or parts can be handled without piling up material or parts along the line. During the last year of operation, the floor space has been doubled, machines added and the line expanded—but the basic pattern of the production line remains as originally laid out—indicating that Industrial did have a complete understanding of the fabricating problems from the beginning.

Production Line "Flow"

The production line is organized so that sheets from stock pass through the power shears near the stock piles; then to the rotary shears or nibblers where cut-outs and miters are cut; then to the forming presses; finally entering the welding section where pieces and parts are welded into sub-assemblies and sub-assemblies welded into complete units. In the welding section of the line the grinders and sanders remove the rough weld excess and give the final finish after essembly. The "flow" from stock to shipping platform is continuous—stock, parts, sub-assemblies never clutter up the line.

Thread Grinder Housing

To illustrate how this production line operates, the series of photographs show a "thread grinder blower cover" in process from shear to truck. This cover is made from 11-gauge, hot rolled black sheet. The cover is a part of the machine ventilating system—in this case air is the cooling agent and the cover houses the blower and directs

Left—Photo 2—A gage set-up on the power shear makes a cut-out for the base of the housing. Note same crew as on press. This crew handles each large piece through both shear and press before piece is passed along the line. Press and shear are side by side. Photo 3, (right)—On another shear a double gage set up and two one-man crews keep the shear working to capacity cutting off scrap edges of small pieces, two pieces at each stroke of the shear.

Photo 5—The first flange on the large sides and top piece is formed along the long edge of the piece. The four-man crew is still handling the piece.

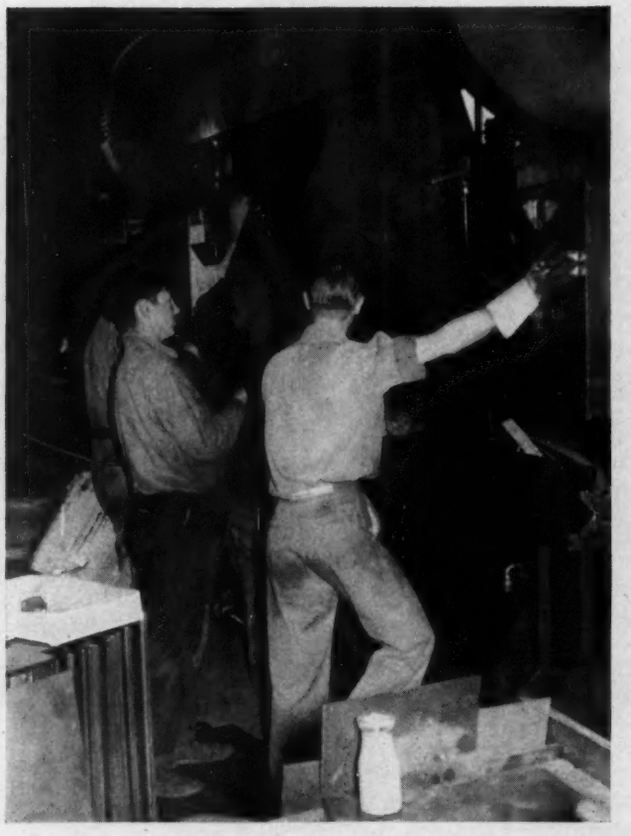


Photo 7—The last operation on the sides and back piece by the four man crew requires a new die set up in the press. A solid rod and V combination die turns the 2¾-inch radius horizontal corner.

the air stream onto the work and is, at all times, out of the way of the operator and the part being machined. This cover is quite large as the photographs show, but is not as complicated as some covers made by Industrial (see photograph 12).

The photographs and captions explain the fabrication step-by-step. In general explanation it should be noted that at each machine stand, equipment and crew have been set up to keep work flowing on schedule and in rhythm with the rest of the line.

Machines "Crewed" to Capacity

For example, one photograph shows a "back" sheet being squared and sheared to size and to remove waste in a large power shear. The size of the shear permits two pieces and two operators to use two gage setups simultaneously so two pieces are run through the shear at each stroke (photograph 3).

Again, one power press is set up to take a piece which becomes the top and two sides (picture 4); this is a very large piece and to handle it four men are needed. But even a four-man crew has been found more efficient than a small crew putting three pieces (one top, one side, another side) through the same press in three operations or three pieces through three presses or brakes. Accordingly, previous operations make up the three-sided piece and plenty of floor space permits handling.

Generally, one press is reserved to form the short radius corners which most covers require for appearance. A range of suitable forming dies permits radii from less than one inch to several inches. On this cover a 2¾-inch radius is used.

Photo 11—The base made of three pieces welded together is here in place in the holding lugs and is being welded to the sides and back of the housing. The lugs act as a fixture for the base.

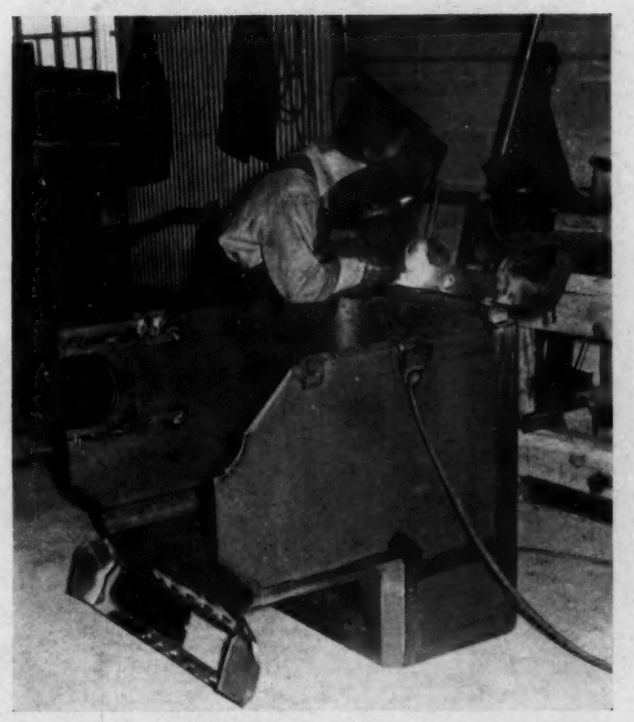


Photo 8—The sides and back piece have been welded to the top piece in a special fixture. Here the housing is upside down with a hinged cover being welded. The round corners of the cover are mitered and the miter is filled in with weld metal while the cover is fitted around the housing so the housing acts as a fixture for the cover.

Corner pieces have been inserted and welded (see right corner) and the grinding wheel is removing excess weld metal. This is a different housing from previous photos but is also made in large pieces—here, two sides and a top. This will be a louvred housing as shown completed in Photo 9.

◆

Jigs and Fixtures for Every Assembly

Uniform conformity to specifications and tolerances necessitates jigs and fixtures for the welding operations. Where a jig is used, the parts are left on the jig until cool to prevent distortion. On this particular cover, however, with top and two sides formed in one piece, a fixture is not required. There is no front—this side is open onto the machine. There is, however, a base and a door in the top. The door and base are welded on small fixtures and are then used to true up the top and side piece. Photo 11 shows the cover upside down, with the base placed in holding lugs and being welded to the sides. Since the base has been "squared" on a fixture, the base acts to "square" the sides and top.

Photograph 8 shows the access door being welded in place. Here again, the door has been "squared" in its welding fixture so the door acts as a fixture for the flange which has been notched; the notches are filled in with weld metal as the door keeps the assembly true.

In addition to the covers shown and described, Industrial Metal Fabricators also manufacture guards of all types and sizes, sump tanks, and many sub-assemblies for the machine tool industry. Light sheet up to 16-gauge can be cut, formed, joined, heavy gauge up to 1-inch can be cut and welded, but not formed. A new building, first quality equipment and a trained personnel, under thoughtful management keeps this shop busy 54½ hours per week.

Get In The Scrap!

There can be no good reason now why sheet metal fabricators and contractors should hold scrap in their shops. The war program needs every pound of scrap—right now. The price has been ceilinged; collection agencies have been set up to facilitate handling. There is nothing to be gained by holding scrap. Turn yours in now.

Fabricating War Products

[Sheet Metal in Aircraft Building]

By Ernest E. Zideck
Sheet Metal Consulting Engineer

There seems to be some feeling that construction of all metal airplanes is a sheet metal skill completely apart from our trade's long time practice. In truth, aircraft work, to a very great extent, is standard practice. Author Zideck here tells us how planes are put together and furnishes engineering tables of metallurgy, stress, gauges, terminology and construction.

WHILE we are treating sheet metal fabricating of war products, it may be worthwhile to discuss sheet metal work in the building of aircraft, because at present and in the future, the aircraft industry will continue to be the principal single user of sheet metal tools and machines and to do by far the greatest amount of work in sheet metal.

The early plane constructors had an outlandish terminology naming the plane portions and parts; the tendency prevailed, and still lingers, to disassociate aircraft sheet metal work from work being done by the legitimate sheet metal trade. But the facts are that in the construction of planes sheet metal is the principal material used; the material is worked by tools and machines built for the sheet metal trade; and now with the demand for accelerated production necessitating prefabricated, snugly fitting parts, the principles of layout and of time-honored methods of sheet metal working have come to be regarded important and are being, belatedly, taught and introduced in the industry.

Plane Building Not Strictly Mass Production

With the possible exception of the new Willow Run Bomber plant and a few others planning mass production of the craft, the bulk of the plane builders, owing to the rapidly changing models, new designs and improvements in planes, continue in what has been described in these pages during the year 1941, as sheet metal fabricating. We have shown that a quantitative, but limited output warrants no expenditures or time in the procurement of mass production equipment by which minutely predetermined and calculated parts are processed from beginning to end through machines doing the blanking, the provisioning and the forming of each part ready for assembly on moving lines. In aircraft building, with larger and larger planes coming along, with innovations in the shapes of the bodies and with the tendencies to prepared woods, light steels, plastics and fabrics as the principal material, the equipping for mass output of any one single model or type is unwarranted, and fabrication methods continue.

Aluminum Allows Cheap Forming Dies

Aluminum alloy sheets and extruded shapes constitute the principal material for a very comprehensive reason: aluminum alloys permit of treatment lending softness and comparative plasticity to the metal; aluminum formation into desired shapes may be accomplished by inexpensive form blocks operating in a rubber pad; and the formed parts may be treated to a hardness and tensile strength surpassing the properties of the same thickness of steel. But the hard-treating of the materials before their joining, piece by piece, into the skeleton body and the covering hull has brought into evidence one fault: joining the parts by welding impairs the hardness and nullifies, especially alongside of the welds, the strength of the metal.

The above is the chief reason why the aluminum alloy craft continues to be riveted. And the rivets, in order to hold the parts under the stress of flying, must be placed closely, as shown in Table 1, in these pages. There are a great many thousands of rivets in the hull of the plane. They also are of the aluminum alloy material, specially treated for the purpose. Riveting, as now practiced, constitutes the greatest amount of manual work that goes into the building of the airplane body.

Aircraft sheet metal work is in all respects sheet metal work as we know it, except that the plane manufacturers under accelerated production induced by war, have greatly enlarged their

TABLE 5

Terms and their meaning in Aircraft Sheet Metal Work

Annealing:	heating the alloy to a temperature dissolving the internal stresses and realigning the crystaline structure. There is "full" annealing, "normal," and "stress relief."
Anodizing:	acid-treating of aluminum alloys oxidizing the metal surface preventing corrosion and binding paint to metal.
Alclad:	trade-mark name of the American Aluminum Company applying to alloy sheets coated with 6 or more percent of pure aluminum. The aluminum coat prevents corrosion of the alloy induced by the presence of other metals in aluminum.
Matrix:	internal grain structure of metal which is disarranged by melting. The grain structure is improved by cold rolling the sheet; is in fluid condition under full annealing of the sheet; and realigns itself into the natural state of the metal by proper cooling after annealing.
Strain Hardening:	hardening the sheets by cold rolling or working them.
Heat-Treatment:	dissolving the stresses in the formed part by exposing the metal to heat; furnace heat; or submersion of the part in a molten bath of sodium nitrate or 50-50 sodium and potassium nitrates. Varying degree of heat is necessary in the process. "2S" sheets will be well heat-treated at 650 degrees Fahrenheit; "3S" and "4S" require 750 degrees; "17S" and "24S" want up to 940 degrees, and so forth.
Quelching:	cooling of the metal after it has been heat-treated; water, oil and "ice box" cooling is used. Cooling slowly from a temperature of 350 degrees to zero and below results in better grade metal.
Aging:	the longer the cooling process lasts the better grade metal is obtained. In some cases the cooling is prolonged; this is "aging."
Axis:	the one marked "X" is longitudinal: it runs from front to rear; the one marked "Z" is "thrust line," vertical, it runs from bottom to top; and the one marked "Y" is the "yawing," it runs laterally, from left to right.
Airfoil:	any plane part surface from which is obtained a useful reaction from air in which it moves.
Mock-Up:	full sized wooden dummy model of the major portions of the craft. This dummy serves in building the metal body of the plane in that fitting measurements, placements of panels, etc., are facilitated and dependable drawings made.
Aileron:	hinged or movable portion of wing producing rolling motion along longitudinal axis of plane.
Fuselage:	a structure of streamline form to which attach wings and tail units and that houses the power plant, the crew, passengers and cargo.
Fuselage Types:	1—Welded steel tube skeleton body enveloped by paneling; 2—Aluminum alloy tubing skeleton body paneled (skinned); 3—Semi-Monocque, consisting in part of reinforced panels or "skin." 4—Monocque: consisting entirely of reinforced enveloping skin. 5—Plastic (also treated wood paneling, etc.).
Basic Load:	stress analysis within the craft when grounded, not flying.
Body:	the fuselage; or hull; or "nacelle," inclusive of cowling and covering. Nacelle is used to denote the enclosure of the power plant. And the term for the enclosure is "skin."
Body Plan:	this is referred to as "lofting." It is a side view of the body showing a sectional view of it, of the whole hull or fuselage at each station, from cowling to tail. This plan also shows each station of juncture of parts and of parts fastenings.
Contour:	the line of formature, outline, outside borderline of curvatures of the whole body and its parts, from largest to smallest.
Brazier Rivet:	preferred in aluminum alloy paneling of the craft, in that it has a large diameter head not much protruding over the outside surface of the riveted panels.
Tensile Strength:	cold rolled steel has a tensile strength of up to 55,000 lbs. per square inch. Aluminum alloy parts of a plane are heat-treated and hardened to an average of 56,000 lbs. per square inch.
Bend Allowances:	these are calculated on the basis of metal thicknesses and the radii of the bends. Soft metal and hard metal bends must be calculated from differing bases.
Bend Relief:	in working aluminum alloy sheets we provide bend reliefs in the form of a certain size hole drilled or punched on the line of the bends, flanges, etc. This especially where the parts are formed by rubber pads.
Templates:	in aircraft building, the blank-layouts are called templates and there is no differentiation as between layouts and marking or checking templets.

capacities, procured the most modern of sheet metal tools and machines and introduced the most scientific methods of heat-treatment of the prefabricated parts. Their formative processes are confined as far as practical to the use of rubber or wood blocks, steel embossed in some cases, pressing the soft aluminum alloy blank into the rubber pad. Brakes and rolls are used on straight and uni-radial formations, and although blanking of the more complicated smaller parts is done by dies, the bulk of the work of producing curved blanking is done on saws, rotary and circular shears and routers.

The sheets and the prefabricated-shapes are

TABLE 1

Comparison of Thicknesses

ALUMINUM .....
..... .016, .020, .025, .032, .040, .051, .064, .102, .125

STAINLESS STEEL .....
..... .010, .016, .019, .025, .031, .037, .050, .062, .094, .125

The above comparison shows the gauges almost identical, with .016 being the same, the next gauge differing by .001, the .025 being alike, the next thickness varying by .001, the next by .003, the next by .001, the next by .002, jumping to .005 in the next, to .006 next, and the .125 being alike again.

Aluminum Riveting	Stainless Riveting
From .016 To .025 ½" spacing.	Aircraft Riveting of Stainless Steel
From .032 To incl. .040 ⅝" spacing.	From .010 To .019 ¼" spacing.
.051 to .064, ¾" spacing	.025 5/16 spacing.
.081, 1" spacing	.031 ⅜" spacing
Above .10—1¼" spacing	.037 to .050, ½" spacing
	.062 to .094, ⅝" spacing,
	.125, 1" spacing.

Note 1: Transverse rows of rivets, when used, are placed $1\frac{1}{16}$" farther apart from each other than are the rivets spaced. If varying thicknesses of metals are riveted, the prefabricated rivet head is put on the thinner sheet.

Note 2: Aluminum constructions are riveted because the heat of welding the alloy sheets weakens the metal alongside of the weld. Spotwelding of the alloy sheets is done sparingly for that same reason, the metal around the weld tending to give way. But in stainless steel constructions welding is done extensively, though riveting is still adhered to, chiefly because of the easier alignment of the larger fuselage (skin) parts.

TABLE 2

Composition of Aluminum Alloy Sheets Designated by Numbers

Note: the "S" means "wrought" sheet or shape.

2S: no admixture
3S: 1.02 percent Manganese
4S: 1.2 percent Manganese, 1.0 percent Magnesium
11S: 5.5 copper, 0.5 lead, 0.5 Bismuth
14S: 4.4 copper, 0.8 Silicon, 0.8 Manganese, 0.4 Magnesium
17S: 4.0 copper, 0.5 Manganese, 0.5 Magnesium
A17S: 2.5 copper, 0.3 Magnesium
18S: 4.0 copper, 0.5 Magnesium, 2.0 Nickel
24S: 4.4 copper, 0.5 Manganese, 1.5 Magnesium
25S: 4.5 copper, 0.8 Silicon, 0.8 Manganese
32S: 0.8 copper, 12.0 Silicon, 0.8 Manganese
51S: 1.0 Silicon, 0.6 Magnesium
52S: 2.5 Magnesium, 0.25 Chromium
53S: 0.7 Silicon, 1.3 Magnesium, 0.25 Chromium
56S: 0.1 Manganese, 5.2 Magnesium, 0.1 Chromium
70S: 1.0 copper, 0.7 Manganese, 0.4 Magnesium, 10.0 Zinc.

Note: From the above compositions of the alloys it is seen that each Number preceding the "S" has a certain meaning, that is, it designates a certain mixture of the aluminum base with a certain percentage of either copper, silicon, manganese, magnesium, nickel, lead, bismuth, chromium of zinc. Each of the mixtures and each percent of this or that metal added to the base metal results in a different workability and characteristic of the alloy.

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treated in the same manner applying to other fabrication: 1—the design is reduced to parts or portions; 2—each part or portion is coordinated to the next adjoining one and means of joining are calculated; 3—the parts are drafted and specified; 4—work-layouts are made of each part, large and small, embodying all the provisions of joining to other parts; 5—tools and processes are calculated by which the blanking, provisioning, forming and make-ready for assembly can best be done; 6—heat-treatment and eventual oxidization or paint application is specified on production sheets; 7—the tools are made and the blank-layouts with production sequence sheets (processing sheets) specifying the particular tools and machines and means to use in producing the particular part, are made ready for the shops.

Supervision Is Prime Need Today

With the above preparation for production all done, production itself is a matter of following the blue print and the instructions. Today, with the producing forces recruited from the ranks of the uninitiated, production depends on the supervisory force. If the supervisor himself knows little about the materials and tools and machines and their behavior and performance, and possesses only a smattering of understanding of the blue print, the specification and the terms used in the processing sheet; then the force working under him will commit blunders, spoil materials and damage machines, with actual producing results remaining negligent.

Given intelligent processing and remedying errors in layouts and specifications, with all-embracing information on the prepared production sheet, the shortcomings of the productive force itself largely is overcome. But if the processing is done by men unfamiliar with the materials processed, with the tools and machines used or the performance of tools and machines prescribed, then the shops, even if manned with intelligently taught and led men and women (yes, women are working in the sheet metal shops in increasing numbers), will nevertheless produce faultily and inefficiently!

In the accompanying Tables the author has condensed information embracing the terminology used in plane building, the nature and naming of the aluminum alloys, their treatments, and other such information useful in the understanding of this branch of sheet metal work.

Sheet Metal Work Is Still the Same

In this connection it might be in place to reiterate what was said so many times in the "Defense Training" articles by this author appearing in the American Artisan throughout the latter part of 1940 and consecutively throughout 1941. Sheet Metal Work may branch out continually into newer and newer fields, but the principles of sheet metal work continue in every field,

TABLE 4

Aluminum Alloys Used in Aircraft

Beryllium Alloy: added to aluminum in amounts from ¼ to 2%, the metal hardens to properties of machining steel and has a tensile strength up to 100,000 lbs. per square inch.

Aluminum Brass: a mixture containing from 2 to 15% aluminum. Is used for castings and forgings.

Aluminum Bronze: same proportion of aluminum; is used for bushings, bearings; tensile strength up to 85,000 lbs. per square inch.

Aluminum Magnesium: up to 10% magnesium, used for sand casting. (Heat-treatable aluminum sheets contain 1% of magnesium.)

Aluminum Manganese: ½% of manganese mixed with aluminum produces soft, ductible sheets which are commonly used in formative work, the formed parts heat treated and hardened after completion.

Aluminum Silicon: up to 13% of silicon mixed with pure aluminum and ½% of copper added produces light alloy for castings, with no shrinkage cracks. 12% silicon is used for sand casting. This alloy is also used for welding rod in welding aluminum.

Aluminum Steel: this alloy contains 1.25% pure aluminum, 1.5% chromium, 0.5 nickel, 0.2 molybdenum. The alloy possesses greater resistance to wear.

TABLE 3

Symbols Applying to Aluminum Alloy Sheets

"S" stands for "wrought" alloy sheets;
"SO" designates wrought alloy sheets "annealed" and rendered soft;
"H" indicates "hardening" by cold rolling of the sheets;
"¼ H": rolled or cold worked to a 25% hardness;
"½ H": to a 50% hardness;
"¾ H": to a 75% hardness.
"2S": strain hardened (cold rolled or worked to hardness).
"3S": "4S": etc., proportionate degree of hardness by cold rolling.
"14S", "17S", "24S", "25S", "52S", "53S": most common sheets used.

"ST" indicates the "heat-treated" condition of the wrought alloy sheets;
"R" stands for "strain-hardened" after heat treatment, and thus,
"STR" translates as follows:
"S": wrought alloy sheet; "T": heat treated; and "R": strain hardened after heat treatment.

"O" implies an "annealed" condition of the alloy sheet, and thus: "SO" means "wrought alloy sheet rendered soft by annealing."
"A" before a number used for symbol signifies that there is less than the usual amount of copper in the alloy, and thus:
"A17S" is a wrought alloy sheet cold rolled to hardness but lacking the full amount of copper in its composition.

"W": alloys conditioned under 350 degrees Fahrenheit resulting in the "T" condition.
"53S" alloys are used chiefly for tubing.

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despite the tendencies of new industries to try to do without them.

We have defined sheet metal work to be: "converting sheet and plate and allied metal into forms and shapes without milling the metal as the machinist does, without working it hot as the blacksmith does, and without melting it, as the foundry does." In other words, all work that converts metal into forms and shapes by wrapping the metal around a given form and into a given shape, is legitimate sheet metal work.

Classification and standardization of sheet metal work is sorely needed: 1—the oldest branch of it is the making of pans and dishes and kitchen utensils and liquid containers and carriers; 2—next was the application of metal to buildings, valleys and eavestrough and gutter and roofs in what is termed "architectural" sheet metal work; 3—closely associated with and yet distinct from the former is the branch having to do with heating and air conditioning; 4—the work called "industrial," having to do with factory equipment, blow piping, dust collecting, machine guards, tanks and booths; 5—the fabrication of furniture, office equipment, utensils which formerly were made of wood, and of new products of convenience or for use; 6—the fabrication of various auxiliary and complement parts associated with the electrical, radio and other such products; and, 7—the building of automotive and aircraft bodies and of smaller items utilized in them.

Planes Are Sheet Metal Products

Aircraft, as long as it continues to be built largely of metal wrappings, is definitely a sheet metal product. The legitimate sheet metal trade should claim it as such and, instead of confining itself to the time-honored tools and means and methods should adopt the newer tools and means and methods and continue leading in all the work having to do with metal sheets and allied shapes. True, the small shop may never build a bona-fide flying machine, but the men running the shop and working in it should be able (given the opportunity and space and tools and machines) to build one.

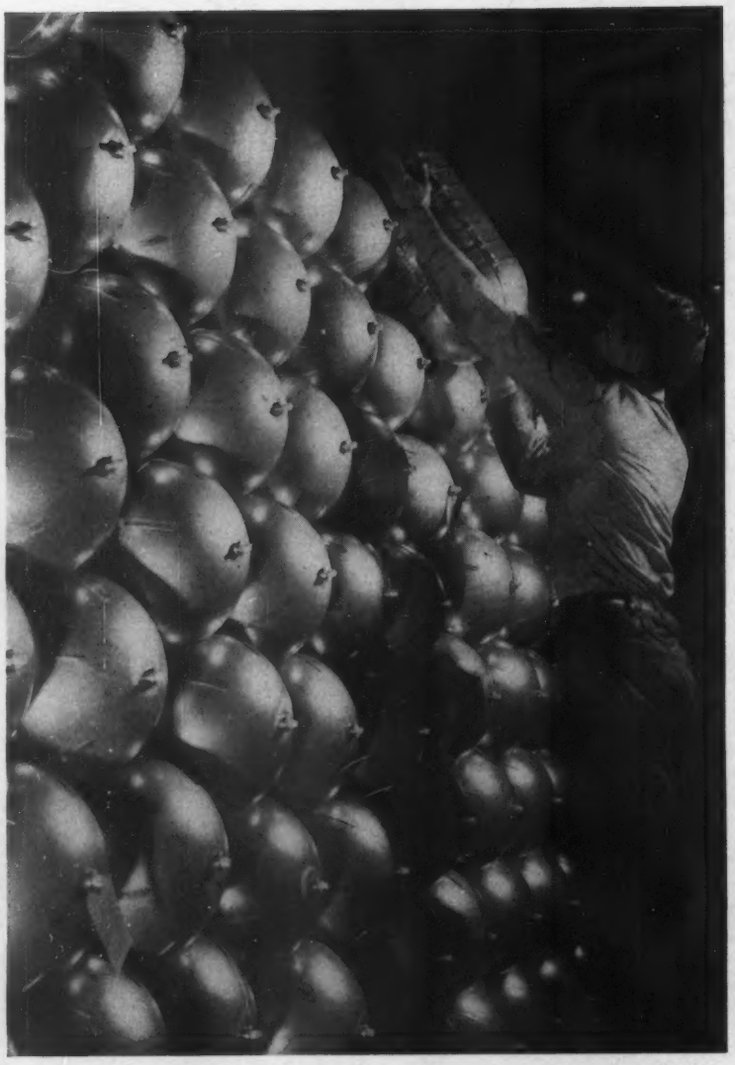
In the preceding articles comprising this series the author has endeavored to acquaint the general sheet metal worker with the processes of sheet metal fabrication. No one can tell when there might be an opportunity for the general sheet metal shop to fabricate, in quantity, a new product. And if he knows enough about the procedure of fabricating, he will be that much nearer to realizing fabrication. New products, when this war is over, will mushroom all over the country. There will be hundreds of chances for the informed sheet metal man to enlarge upon the scope of his work.

The present article on Aircraft Sheet Metal Work is actuated by similar considerations. There are certain new means and modes employed in this work which it is valuable for the trade to know. The means and modes, the employment of hard rubber or wood blocks operating on a moulding rubber pad, for instance, may be easily adapted to other metals, soft copper or iron or annealed steel, lead and other pliable materials. We already described in these series the uses of

(*Continued on page* 100)

Beverage Tanks To High Altitude Oxygen Tanks

(Photos by Palmer for OEM)



Oxygen cylinders for high altitude flying manufactured by a converted beverage container manufacturer.

AN interesting conversion of a peacetime beverage container fabricator to the war time production of vitally needed oxygen cylinders for high-altitude fighting and bombing planes is partially pictured in the photographs on these two pages.

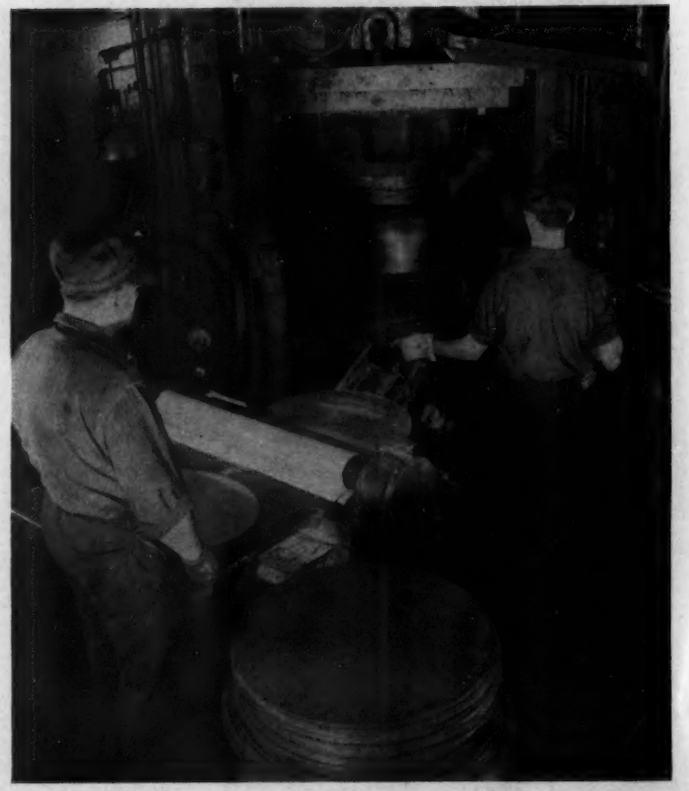
Behind the production is the story of a need for a light metal tank containing oxygen compressed to 400 pounds per square inch which would not explode and shatter when pierced by bullets. Preliminary tests made on conventional cylinders of pre-war days showed that this oxygen, when suddenly released by a direct hit of a machine gun bullet, caused an explosion of flying metal that was as dangerous as a direct hit from a powerful anti-aircraft weapon.

Experiments were carried on in the laboratories and on the proving grounds with all types of cylinders, keeping always in mind the limitations of size, durability and resistance to the explosive shattering of the pierced metal under pressure.

The factory engineers found a way to do the job. The new cylinder is not only shatter-proof but it also resists tearing when punctured by a tumbling 50-caliber machine gun bullet.

In order to measure up to Army standards, not one but 10 cylinders out of a set of 12 had to withstand puncture by a tumbling bullet without shattering. The cylinders exceeded these requirements.

Once the cylinder had been developed and proved acceptable, the task of setting up a production line was undertaken. Transfer of the line for the manufacture of stainless steel beverage containers over to this war product was immediately started. The huge 750-ton toggle presses were rearranged to stamp out the spherical domes of the cylinders and the elaborate auto-

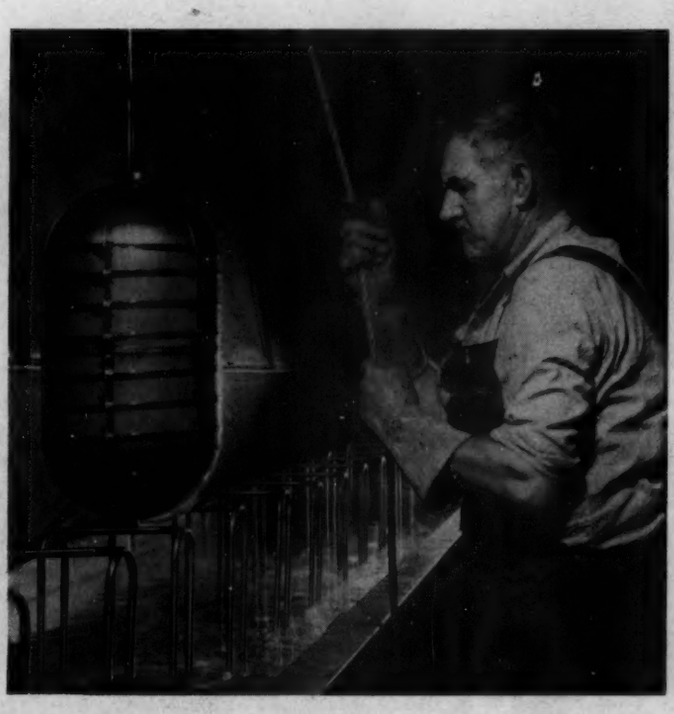


Right—The first step is stamping the shell of blanked and cut stainless steel discs in this 750-ton press. Before stamping the discs are passed through rolls where the drawing compound is added. One stamp forms a half cylinder which is then trimmed and punched for the valve hole.

Circumferential straps are welded around the cylinder to prevent disruption by bullets; edges are then trimmed; then this twin brush cleans all scale inside and outside.

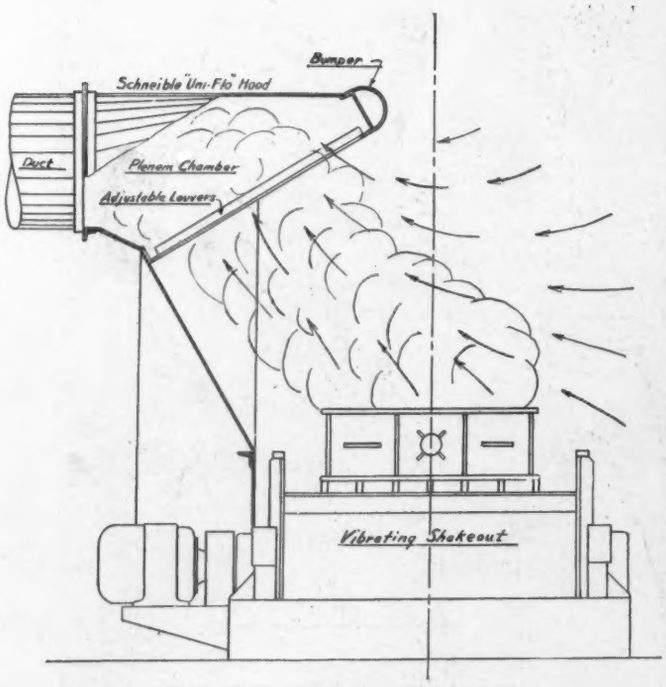
matic welding equipment was quickly adapted to the intricate welding operations required.

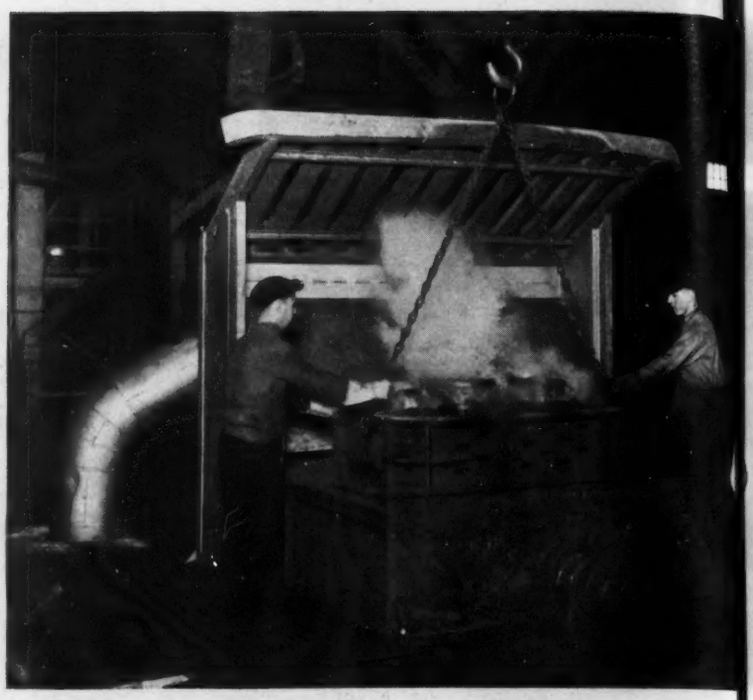
Baths were designed containing chemical solutions that acted as passivating and purifying agents and ingenious physical and pressure tests were devised to make sure of the product.



A bath follows brush cleaning; removes more scale; removes all chemicals; and gives a satin-like, sterile surface.

The two cylinder halves are brought together in this atomic welder and welded. Operator is ready to remove complete cylinder.





Adjustable Louvred Dust Collecting Hoods

[*Reprinted from National Safety News*]

CASE studies made by C. C. Hermann, Chief Engineer of the Claude B. Schneible Company, Dust Suppression Engineers, Chicago, have revealed the importance of having dust collector duct terminals properly hooded to provide efficient intake of dust and fumes.

Three types of operations were studied: foundry shakeouts, spray booths and heating furnaces, all under normal operating conditions.

Dust, soot and fumes arising from these operations were observed, their travel charted and a check made of accumulations that failed to enter the duct.

It was found that dust particles and fumes that did not come within a certain range of the intake duct were not removed from the plant atmosphere, but were left to settle around the operation. It was reasoned that, like a vacuum cleaner which only takes in particles coming in direct contact with the nozzle orifice, extending the intake over a greater area would bring the dust and fumes which had been evading the intake under control.

Experiments along this line were tried, several funnel-like types of intake hoods being developed for the purpose which proved a step in the right direction, but not quiet suitable since some dust and fumes continued to evade the new extended type intake hood, unless large volumes of air were handled. It was found that three factors entered into proper operation of the new hoods:

1. Natural drafts which were different in all three study cases and varied from season to season according to monitor and side wall window and door ventilation, and work temperatures.

2. Some operations, such as in spraying where impact set up a reflex action, caused fumes to go to either side of the intake hood.

3. The size of the work affected the flow of dust and fumes into the intake hood, bulkier objects causing them to be deflected to either side or above the hood opening.

With these things in mind, several types of hoods were developed which would envelop the entire equipment in a moving air stream and work as much as possible without interfering with loading or handling of work either by hand, overhead crane, conveyor or industrial truck.

The best location of the hood was found to be above and to one side of the operation with curtains on the sides and back to prevent as many eddy currents as possible from reaching the work. Exhaust ducts could be taken from the plenum back of the louvres either upwards, downwards or sideways, as would best suit the application with the design adopted.

To cope with the three factors mentioned above, a set of movable louvers were devised which can be adjusted to meet various conditions. Where dust and fumes have a tendency to go to right or left, the louvers can be moved toward the middle, closing off the plenum chamber at the center and pulling the dust in from the two sides.

Straight edged or sharp edged slats were orig-

(*Continued on page* 108)

Wanted urgently:

STEEL SCRAP

Shortage of steel scrap is threatening the war-production program.

If ships, planes, tanks and guns are to be produced in the volume needed to win the war, the country's steel-making facilities must operate at full capacity. But the plain truth is that the steel scrap to support continued capacity operations is not available, and not in sight.

United Effort Will Do the Job

Thanks to the construction of new blast furnaces, the deficiency is being partly made up by using more pig iron in steel-making. But tremendous quantities of additional scrap must be found within the crucial next few months.

Actually, many thousands of tons of steel scrap are potentially available *if only they can be gathered in.* This scrap, needed so urgently in the war effort, is scattered through the industrial plants, mines and railways, the farms and the homes of the nation. The problem is to collect it and get it moving to the steel mills. Everyone must help. If everyone will, there will be scrap to meet the needs of the war-production program.

Make a checkup in your plant or warehouse, or any other property you own or manage, and in your home.

Have any odds and ends of steel or iron that may be lying around collected. If you have any obsolete or idle equipment, machinery, or parts—anything that's made of iron or steel and isn't really needed—junk it, and get the scrap moving toward the steel mills.

How to Put Your Scrap to Work

Some iron or steel now lying rusting and forgotten around your property may help to save the lives of Americans in the battle areas. Gather up every possible bit of iron and steel scrap. Sell it to a local junk dealer, or get in touch with your local scrap salvage committee. Put your scrap to work for your country. It's needed, now!

BETHLEHEM STEEL COMPANY

RYBOLT

Keep the Home Fires Burning

BY REPAIRING FURNACES WHERE NEEDED, REPLACING WHERE NECESSARY

You can help the war effort by seeing that the furnaces in your territory are repaired and placed in condition to give good heating service this winter.

This is your responsibility to the government and at the same time your opportunity to keep your business going. Furnace repair work is profitable and if you develop enough of it, it means substantial business for you. Now is the time to interest your customers in this matter before cold weather sets in. Urge them to have their furnaces cleaned, checked for repairs and put in best possible condition. It means cold weather comfort for them and conservation of fuel. We have *original* repair parts available for all RYBOLT heating units and will be glad to cooperate with you in every way possible.

REPLACEMENTS UNDER ORDER P-84

Remember, the furnaces which are worn out and beyond repair can be replaced under Government Order P-84. There is a sizable amount of this business to be had and it will pay you to check carefully the condition of furnaces in your territory. Write for complete information.

RYBOLT SERIES 15

Cast Iron Coal-Fired Gravity Furnace

rh

TRADE MARK

Ideally adapted for replacement business, RYBOLT Series 15 is a quality furnace throughout, attractive in appearance, designed and built for durability, utmost heating efficiency and economy. Distinctive features are the large capacity fire bowl and combustion chamber, corrugated inside and out, extra large duplex ball-bearing grates, waist-high shaking lever, slip-on front cast construction, effective smoke consumer, smoke- and gas-tight joints, extra weight castings. 5 sizes.

THE RYBOLT HEATER COMPANY

615 MILLER STREET • ASHLAND, OHIO

Wholesaler's Problems in a Wartime Economy

Report 125, Geo. S. May Business Foundation

THE margin of gross profit on individual items is closing every day like a pair of pincers. Since we are at war, price regulations, priorities, and assignments are reducing the number of articles available for sale. The flexibility normally offered by variety is diminishing. All of this will force wholesalers to do business on a very different basis. To say "will force" is not quite correct, for wholesalers are being forced *now* as never before to reconsider, to analyze again every phase of business organization.

Regardless of war, profit continues to be the fundamental business objective. Much profit will rightly go for taxes. During the war, industrial efficiency becomes increasingly important and profit remains the only feasible measuring stick for such efficiency.

The problem that business now faces is not one of ascertaining how *much* profit may result under existing organization, but rather one of determining what organization is necessary to insure a desired profit. This distinction is real, and it is basic. Our survey indicates that the solution of the problem may require drastic revisions in the wholesale structure.

"How Much Profit" Is Out

In the organization of the wholesale business for future profits, we must re-examine the prime factors involved and mark the effect of circumstances on the profit picture. In this article, the importance of profit controlling functions to the business organization as a whole will be examined by means of formulae and graphs. Knowing certain factors, we shall see how an undetermined factor may be ascertained with mathematical precision. Then, the vital functions of the wholesale business will be subdivided and fitted into the organizational structure.

Selling price, cost of goods, operating expenditures—these factors as they relate to volume are the fundamentals which make or break profit possibilities. Now, the interaction of these factors can be determined by formulae, or it can be shown on graphs.

Graphs will show results similar to those ascertained by the above formulae. While graphs are not as accurate in detail, they do portray solutions more readily. But a different chart must be drawn to illustrate every cost structure.

The graph in Figure 2 is designed to show how the required sales volume may be ascertained at various gross profit and operating cost levels. It may be used in several combinations to indicate, for example, the percentage of the sales dollar allowable for variable operating costs, or the gross profits required to return the desired net profit.

It is assumed in Figure 2 that a wholesaler expects to earn 20 per cent on an investment of $26,712.00, or a return of $5,342.40. His fixed operating cost is $21,220.

Chart Tells Profit Story

First, a line is drawn from the zero point on Scale 1 to the point on Scale 2 represented by the percentage of gross profits (18.1 per cent). Then, by adding the net profit required to the fixed charge, we have a total of $26,562.40. From a point represented by this figure on Scale 1 a second line is drawn to a point on Scale 3 which represents the percentage of sales required for variable operating cost (10.9 per cent). At the intersection of these two lines, draw a vertical line to Scale 4. This point will indicate the sales volume required to realize the 20 per cent profit, which in this case is $368,922.00.

To find the percentage of the sales dollar allowable for variable operating costs, arrange the graph in this manner. First draw a line from the zero point on Scale 1 to the point on Scale 2 representing the per cent of gross profits (18.1 per cent). Second, from a given sales volume on Scale 4 ($368,922.00) draw a vertical line. At their intersection a third line beginning at the $26,562.40 point on Scale 1 (which is the sum of the desired profit and fixed operating cost) will terminate on Scale 3 at the exact point indicative of the percentage of the sales dollar allowable for variable operating cost (10.9 per cent).

Or, if the wholesale company wants to figure out the required gross profit necessary to net a certain profit, the graph should be used in this way. Draw a line from the $26,562.40 point on Scale 1 to the per cent of sales represented by variable operating cost on Scale 3 (10.9 per cent). Now, draw a vertical line from Scale 4 at the point of definite sales volume ($368,922.00) to intersect the first line. Then, a final line begun at the zero point on Scale 1 will project through the intersection to Scale 2 and show the required gross profit that will be necessary to net the desired profit (18.1 per cent).

How can each of these essential functions be subdivided and fitted into an organizational structure?

When organized for profit, the wholesale busi-

ness must be molded into a structure that can operate within the portion of gross profit left after adequate net profits have been deducted. Now, a potential gross profit figure can be determined by weighing the gross profit on individual items. Then, the per cent of volume of each item in relation to the total volume sold should be measured. The first step in this weighing process is one of classifying all products sold according to the gross profit each one yields.

Next, the volume of each kind of goods sold in each class is determined. To find the per cent of the total represented by the volume of each class, divide each volume by the total volume. Each percentage is multiplied by the gross profit of its respective class and the sum will represent the potential gross profit.

To illustrate. A wholesale firm is selling these various products at the following gross profits:

Product	Gross Profits	Volume
A	17%	$ 2,500
B	6	3,000
C	33	6,000
D	20	8,000
E	17	5,000
F	17	2,500
G	6	3,300
H	20	1,500
I	6	2,700
J	33	600
K	20	1,800
		$36,900

Products B, G, and I are in the 6 per cent class.

Products A, E, and F are in the 17 per cent class.

Products D, H, and K are in the 20 per cent class.

Products C and J are in the 33 per cent class.

Sales in the 6 per cent class are $9,000; in the 17 per cent class sales are $10,000; in the 20 per cent class sales are $11,300; and in the 33 per cent class they are $6,600. Dividing these total sales in each class by the total sales of $36,900 we find that:

The 6 per cent class represents 24.390 per cent of the total; the 17 per cent class represents 27.100 per cent of the total; the 20 per cent class represents 30.623 per cent of the total; the 33 per cent class represents 17.887 per cent of the total.

Now, multiplying each of these percentages of the total by their respective class percentages, we find that the 6 per cent class has a weighted value of .06×.2439, or .01463; the 17 per cent class has a weighted value of .17×.271, or .04607; the 20 per cent class has a weighted value of .20×.30623, or .06125; the 33 per cent class has a weighted value of .33×.179, or .05907. The total weighted value for all classes is .181 or 18.1 per cent.

This weighted value, of course, depends entirely upon this particular ratio of sales. This wholesaler's gross profits range from 6 per cent to 33 per cent. It is important, therefore, that the sales be divided among the various classes so as to keep the average gross profit from falling below 18 1/10 per cent (that is, when the firm

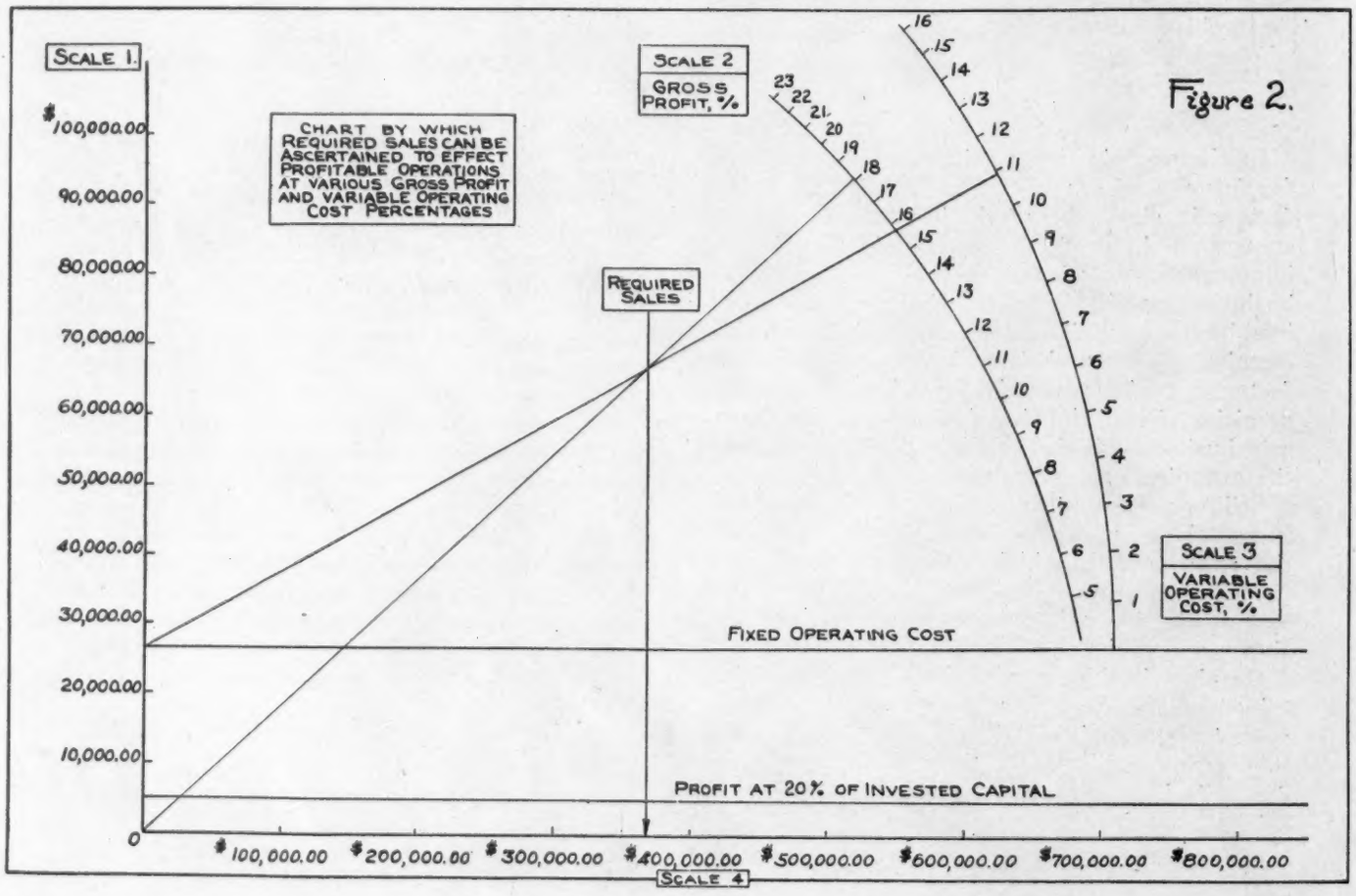


Figure 2.

is operating with a total volume of $36,900, as we have here assumed).

The analysis indicates one important essential. The firm should be in a position to control sales volume on the various items, or at least the sales volume of the various classes. This can be accomplished only through *selective selling*. While 18.1 per cent gross profit may not be the gross profit that this operator will require to make an adequate profit it is an indication of the temper of the company's sales. It is the starting point for calculations.

Net Profits

Turning now to the net profit function, we must consider an essential responsibility so broad in scope that it must be entrusted to an executive capable of coordinating all other functions. This wholesale executive must have the business experience and the perspective to coordinate the remaining primary functions of gross profit, operating cost, and volume.

You see, the purchasing agent's point of view may well be that with lower operating cost and a higher volume he would not have to maintain such a large gross profit ratio. The comptroller will feel that if the company had a higher sales volume and a greater gross percentage it would not be necessary for him to control costs so rigidly. Then, too, the sales manager can always contend that if higher gross profits were attained along with lower operating costs he would not have to fight so hard for volume. These points of view may well lead to squabbling that will destroy the organization's morale. That is why a qualified executive must coordinate each of these functions and their inter-relationships.

Suppose the required net profit figure has been established. Now, suppose it is found that the volume of business needed to net this profit can't be made. Operating cost must be reduced or gross profit percentages must be increased.

Fixed Operating Costs

By fixed operating costs we mean those costs that are not directly influenced by the volume of business done. These costs usually include depreciation on buildings and equipment, real estate taxes, insurance, rent, light, heat, fixed salaries of executives and key personnel. The word "fixed" should not be construed to mean costs that cannot vary. Rather, it means costs that are not likely to vary in proportion to volume.

We know that the numbers and salaries of executives and other key employees are changed from time to time. These two factors might be considered by some as representing variable costs. Unless these costs, however, can be and *are* kept in a definite ratio to volume they become fixed charges. If any charge is varied somewhat, but not exactly in proportion to volume, the minimum portion of that charge (which does not vary) should be set up as fixed. The difference between the minimum and the actual charge is a variable cost.

Fixed charges should at all times be held to a minimum. The greater the factor of fixed charge, the more drastically is the profit picture affected by variations in other factors. Particularly is this true of the volume factor. Of course, the ideal situation would result if all costs could be maintained at a constant ratio with respect to income. This accomplishment is neither practical nor possible, but management should continuously strive to hold fixed charges to a minimum. Fixed charges can be held down or reduced by greater utilization of fixed assets, economies in heat, light, and rent. Particularly can fixed charges be minimized if the proper method of paying executives and key employees is used. Executives and key employees should receive a base salary which represents only a portion of their total earnings. This portion should be treated as a fixed cost. The balance of their earnings should depend upon their performances with respect to the accomplishments of their required duties. This portion should be considered as a variable cost.

It is not uncommon to find among wholesalers vast areas of unused floor space. Lights are often burning when they are not being used. Warehouses are heated above necessary temperatures. Storage areas are often conducive to high insurance cost. Executives and employees sometimes receive substantial salaries regardless of the company's income, or the proficiency with which they execute their duties and responsibilities.

Fixed charges must be carefully analyzed and reduced to meet basic requirements. Every dollar paid out must be reconciled as an expenditure for some indispensable value received.

Variable Operating Costs

Variable operating costs are those costs which are influenced by volume. They usually consist of commissions to salesmen, salesmen's expenses, fuel and oils used by delivery vehicles, warehousing and labor. These costs, like all other costs, should represent only indispensable values received.

Excessive sales commissions, expenses, and allowances, for example, are often tolerated simply because toleration has become a practice in certain wholesale establishments. A careful analysis will adjust commissions so that they will more nearly represent value received in selling effort and still be fair to the salesmen. While flat commissions form the traditional basis of salesmen's compensation, they are by no means equitable. To be equitable, commissions would have to be weighted against buying habits of the trade, gross income, and cost of handling goods.

Warehousing employees are frequently retained when not required, and even when required they are permitted to operate in a manner that renders their efforts out of proportion to value received. During the process of measuring cost requirements it is often found that ware-

house labor involved in putting up individual orders greatly exceeds the entire gross profit available in the order. This cost can be held to a minimum if routines and procedures are properly organized. Wholesalers, in a sense, have a greater problem in getting value out of their labor than do many other types of business by virtue of the fact that it is a little bit more difficult to supervise, and a little bit more difficult to measure and control. This does not mean that it is impossible to control.

Now, warehouse labor requirements can be measured and labor can be held to these requirements. Costs such as supplies, postage, and telephone while of lesser magnitude are just as important. These costs can do a great deal to upset the profit picture if they are permitted to run hog wild, as they are in some cases. Actual requirements in respect to volume can be ascertained for these expenses if requirements are carefully analyzed. After requirements have been established it is rather easy to sense waste and misuse and curtail them.

Volume

Volume is a highly essential and extremely flexible factor in the profit problem. It is vital because it affects nearly all other factors. Volume control, therefore, can be said to be somewhat more important than almost any other control in business. To be effective, volume controlling effort must be exerted at the right time and place. "Timing" means getting in when the demand is there. "The place," of course, means getting in where the demand exists.

Carefully selected markets are the stepping stones by which volume is eventually reached. Improper market analyses, or a complete lack of them, often cause failure to secure proper volume. Many instances have been found where wholesalers were operating in total ignorance of, or with a misconception of the potentials of their markets. Shifting population, changing consumer habits, drifting outlets, community buying power, accessibility, and competition are constantly affecting markets. Markets, therefore, are not stable. They change continually.

Experience has shown most of us that as attained volume grows closer to the potentials of a market the cost of such attainment becomes greater, and it requires additional sales effort. As closely as it can be measured, the effort required by an individual company to obtain a volume above its share of the potential in a given market increases almost with the square of the percentage the volume represents of the potential.

Suppose the potential volume of a given market equals a million dollars for a certain period and a company's share of the potential is $100,000, and that share is costing them $10,000. To obtain a $200,000 volume it would cost them nearly $40,000. A $300,000 volume would cost them nearly $90,000. On this basis it can be easily seen that a point of diminishing returns will quickly be reached if a volume is attempted in excess of the logical share.

These figures, of course, are based on competitive equality, and while competitive influence is seldom equal in every respect, there usually exists certain compensating factors that cause a levelling off of influence. If the volume must be increased it may be more profitable to expand one's market than to attempt to attain a larger portion of a present market. Shares of a market cannot be ascertained by simply dividing the potential by the number of competitors. Good will, price, service, and quality are all factors that must be taken into consideration and must be weighted according to customer valuation.

Don't Look at Yourself in a Mirror

Now, let's consider an analysis of outlets. Very few salesmen are capable of sensing, translating, and properly communicating the sentiments of those they call on in solicitation of business to their home office in a manner that permits a sensible analysis. A wholesaler or any other business house is just what it is as viewed by its trade. Too many dealers look at themselves in a mirror instead of through the eyes of their outlets.

Business must be firm in its trade policies, but those policies must be acceptable to those on whom business is dependent for success. Many a dealer has been heard to say, "I don't understand why we don't get more business; we give better service, handle best quality goods, and our prices are right." Field investigations have given the answer. The virtues that dealers proclaimed are what *they* thought existed. Actually, the outlets in the communities felt otherwise. Some of these operators when faced with the truth made an effort to set policies that would be looked upon more favorably by their outlets and so they have prospered.

After the potentials of a market have been established, outlets ascertained, competition acknowledged and properly considered, and one's own position properly qualified in the eyes of the dealers, it is not difficult to weigh out a reasonable volume which should represent a normal share of the market. If this normal share does not represent the sales volume required to net a satisfactory profit, then consideration must be given to the advisability of expanding the market, or going after additional business in the market at hand.

This requires very careful analysis, for expanding markets usually entail greater operating facilities, which usually increase fixed operating costs and direct operating expenses. The rate of increase, however, in proportion to income is usually smaller when expanding a

(*Continued on page* 105)

New Products

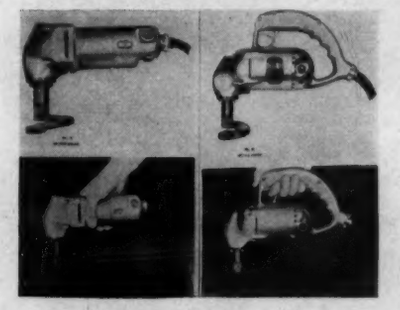
For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 85 and mail to us.

● Indicates product not listed in 1941 Directory.
△ Indicates manufacturer not listed in 1941 Directory.

89—Improved Lectro-Shears

Black & Decker Manufacturing Company, Towson, Maryland, has redesigned both the 16 and 18-gauge Lectro-Shear.

The No. 18 Lectro-Shear has been reduced in outer dimensions, so that the motor housing forms a comfort-



able operating handle, thus reducing length and weight of this tool, and improving operating balance and control. The No. 18 cuts up to No. 18 gauge sheet steel.

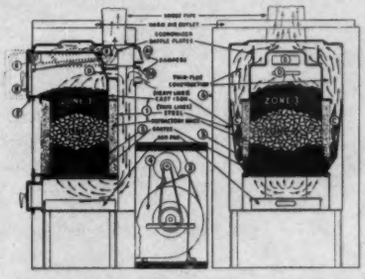
The No. 16 Lectro-Shear has an improved operating handle with better balance and easy control on curved and irregular lines. It is equipped with an instant release trigger switch, with locking pin for continuous operation. The handle can be used over the tool or at the rear end. This tool cuts up to No. 16 gauge sheet steel.

◆

●90—Self-Stoker

Viking Manufacturing Corp., 1234 Ray St., Dayton, Ohio, offers the new Viking Self-Stoker furnace using bituminous and anthracite coal, or coke, priced little over a stove.

The Self-Stoker uses inexpensive grades of fuel—domestic stoker size or smaller are satisfactory. After a bed of red coals has been established,



the fuel chamber is filled, and the combustion control is moved to "H" for most heat, to "M" for medium heat, or to "L" for low heat. Fuel may be needed once in twelve hours if the control is set at high operation, or once in three or four days if set at low operation.

The fuel chamber can be described as three zones—firebed, coking layer, and unburned fuel. Combustion takes place all across the grates and at the sides and not in the fuel chamber. The fuel chamber has a sealed dome. Twin flues with an economizer baffle each force the hot gases to "scrub" the walls of the combustion chamber.

The cabinet is 20-gauge steel with 26-gauge inner liner, finished in gray enamel, flanged 1½-inches for duct connection.

◆

91—Temperature Limit Control

Automatic Products Company, 2450 N. 32nd St., Milwaukee, announces a new A-P type U temperature limit control for use with floor furnaces, central heating units and heaters, using a vaporizing type burner.

This unit consists of a charged Thermo element, capillary tube, throttle and shut-off mechanism, and

safety constant level oil control valves. The Thermo element is placed either in the furnace bonnet, or under floor grill, on floor type furnaces. Here the temperaure of the bonnet or grill, acting through the Thermo element, controls high or low oil flow to the burner, or in case of abnormally high temperature shuts off the flow of oil by spring force.

The new control can be equipped for automatic operation through wall thermostat by the attachment of an A-P thermostatic electric conversion set.

◆

●92—Whippet

David Levow, 308 W. 20th St., New York City, manufacturers' agent, announces "Whippet" fire extinguisher compound, packed in 2½-pound containers for home use, in 10- and 40-pound cans for industrial use.

Whippet is effective against all types of fire—gasoline, benzine, naphtha, tar, grease, oil, electric, acetylene gas, chimney and forest fires, etc. In recent tests, it has put out the fire caused by an incendiary bomb. It is non-poisonous and contains no noxious gases.

●93—Flow Gun

DeVilbiss Company, 300 Philips Ave., Toledo, Ohio, has developed a new flow gun, Type SGF, to help aircraft and other war industries speed operations. It is designed for caulk-

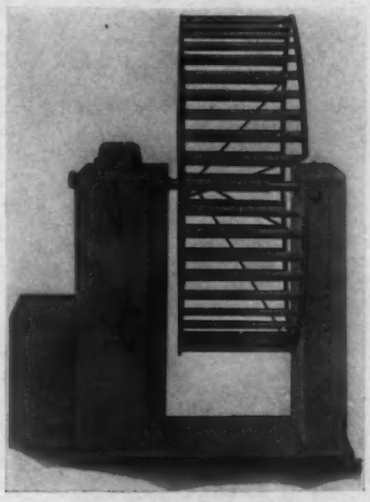
ing, cementing and other flowing operations where plastic materials such as crack fillers, sealing compounds and heavy paints are used. It is small, lightweight, and fits the hand comfortably.

Material is fed to the gun under pressure and is extruded into cracks, grooves and over seams which are to be sealed. Flow can be controlled.

◆

●94—Balancing Machine

Bear Manufacturing Company, Industrial Division, Rock Island, Illinois, manufactures a floor-type industrial balancing machine — Model 380—to indicate the angular position of location, in addition to the quantity of correction necessary by means



of a simple electrical circuit and dials which are gauged in thousandths.

The company builds several models of bench, floor and pit-type balancing machines to take a wide range of sizes of fans, blower wheels, impellers, propellers, in addition to other mechanical rotating bodies—gears, pulleys, wheels, armatures, etc.

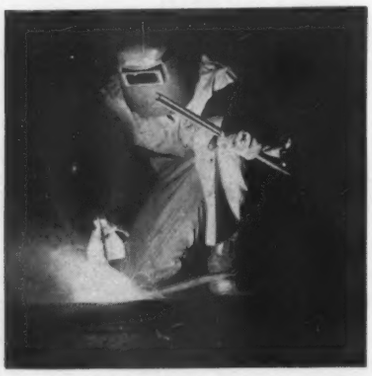
New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 85.

95—Fleetweld 11

The Lincoln Electric Company, 12818 Coit Road, Cleveland, announces a new arc welding electrode, designed to speed arc welding.

Fleetweld 11 was created expressly for use with the "Fleet-Fillet" technique of arc welding. Fleetweld 11 is a fast flowing electrode and gives



deeper penetration of metal into the root of the joint. It is of shielded arc type and heavily coated to exclude oxides and nitrides from the weld.

High currents are used and the electrode is held at an angle of 45 to 60 degrees with the horizontal plate and 90 degrees with the electrode path along the joint. The arc produced is so short, the electrode coating practically touches the metal.

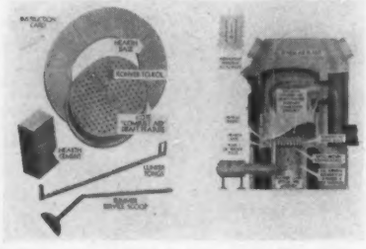
Fleetweld 11 is made in 18-inch lengths and two diameters—$\frac{5}{16}$-inch and ¼-inch, packed in 50 pound cans.

◆

△96—Konver-To-Kol

Albert Lea Foundry, Albert Lea, Minnesota, is manufacturing a conversion unit for easy installation in oil-burning furnaces, and for sale through The Heimann Company, 1218 Harmon Place, Minneapolis—national sales representatives.

Konver-To-Kol consists of two main sections—a hearth ring which



is placed on the fuel oil combustion chamber and a special casting with pin type air openings and special air jets for extra back draft. This latter feature is called "Combust-Aid" and insures burning of fuel gases usually lost up the chimney.

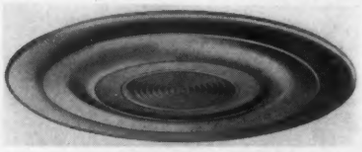
There are two models: Model "R" for 18-24-inch diameter round furnaces; and Model "Q" to be purchased with Model "R" as extension sections.

Thermostat control makes a regulated fire with uniform heat.

◆

97—Supply-Return Venturi-Flo

Barber-Colman Company, Rockford, Illinois, has designed the Venturi-Flo combination supply and return (or exhaust) unit for installations where simplification of the duct layout is of primary importance. The unit is suited for existing build-



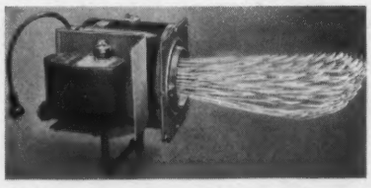
ing work since the return duct may be run to the same point as the supply duct instead of leading to a register at some other location.

The removable center section consists of a series of concentric rings. A gasket around the outer edge forms a tight seal with the ceiling.

◆

△98—Horizontal Oil-Burner

Oil Devices, 341 East Ohio St., Chicago, offers the Breese horizontal oil burner incorporating the hydroxilating principle used in all Breese pot type burners. The burner produces a long cylindrical flame, 18 to 36 inches in length.



The burner is light in construction, uses less steel, no chrome, very little copper and burns any of the fuel oils commonly used for heating and cooking. The burner is suitable for war housing—furnaces, floor furnaces and low-draft space heaters.

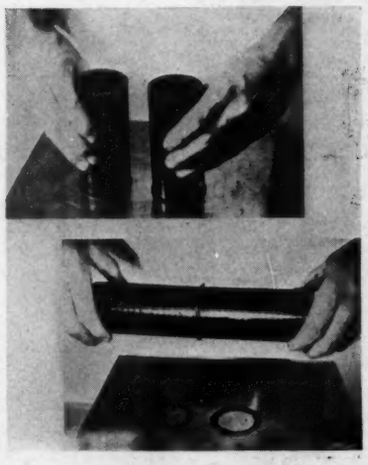
◆

99—No. 530 Electrode

Wilson Welder and Metals Co., Inc., 60 E. 42nd St., New York City, has developed a new electrode designed specifically for all-position welding of mild steel with A-C type welders, in the following diameters: $\frac{1}{16}$, $\frac{5}{32}$, ⅛ and $\frac{5}{32}$-inch.

The Wilson No. 530 electrode complies with all requirements of the American Welding Society Classification E6011, American Bureau of Shipping, Group HlG and BlG for A-C and other specifications qualifying it for use on war work.

The finished weld deposit is quite smooth and has a uniform surface contour.



△100—Plastic Pipe

The Dow Chemical Company, 917 Jefferson Ave., Midland, Michigan, manufactures a plastic pipe in the same dimensions as extra strong steel pipe of 2-in. OD or less.

Saran pipe is produced in smooth, round, accurately sized lengths having dimensions identical with those of strong iron pipe. It can be readily welded, heated and bent. The pipe can be cut with a wood or hack saw and threaded with ordinary iron pipe dies.

The pipe is resistant to extreme moisture, chemicals and solvents, coupled with strength and fatigue life.

Saran pipe is made of a new thermoplastic resin. The base resin is odorless, tasteless and nontoxic. The plastic does not burn, and its toughness and abrasion resistance is high. Heat resistance is excellent up to 175 deg. F.

Tabular data—sizes, weights and bursting pressures—are available.

Fittings for Saran pipe are not yet available. Molds are now being constructed to make additional flanges, with threaded ells, tees, and couplings.

In welding Saran pipe, pieces are placed on a hot plate heated to 350-400 deg. F. and held until molten material appears. Pieces are then placed together in proper position, pressed firmly and allowed to cool.

◆

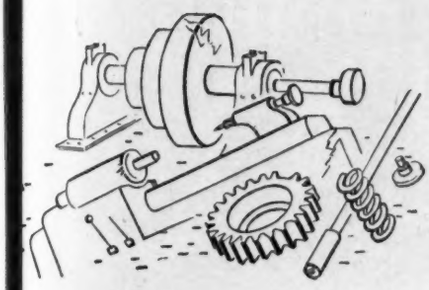
101—Fire-Hearth

Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago, announces Fire-Hearth castable refractory for setting stokers and oil burners.

After being mixed with water, Fire-Hearth is poured into place and trowelled smooth. It sets to concrete-like hardness without the application of heat, and should be allowed to stand for 12 hours before the fire is started.

Fire-Hearth is sold in dry form—packed in 100-lb. waterproof bags, also in 50-lb. cartons.

WANTED:



6,000,000 Extra Tons of Scrap Iron and Steel

TO KEEP PLANTS RUNNING FOR WAR PRODUCTION

The steel industry must have more scrap iron and steel—not next month or several months hence—but *RIGHT NOW!*

The expected return from regular sources—chips, turnings, borings, clippings, punched-out pieces, etc.—will be 6,000,000 tons SHORT of the tonnage required to produce the steel needed for War Production.

If this scrap isn't obtained *QUICKLY,* steel mills and furnaces—even war production plants—may slow down or shut down. Men may be laid off—and our soldiers may not get the equipment which can mean life or death—victory or defeat. Remember, it takes a ton of scrap for every two tons of steel produced in the open-hearth or electric furnace.

6,000,000 tons of scrap seems like a lot—but if every man in industry turns in every pound, every single piece he can lay his hand on, it can be obtained.

That old obsolete or worn-out machine back in the corner—those broken or worn-out jigs, templates, rolls, patterns, molds, dies, tools and fixtures—that old line shafting and pulleys which will never be used again—that pile of old pipe, gears, castings and what not behind the shop—that old water tank or steel structural work—old autos and trucks—that's the scrap needed here to win the scrap over there.

Everyone can "get in the scrap" by digging up scrap—around the plant and at home, too. Appoint a competent scrap committee—put this story on your bulletin boards (we'll gladly send reprints)—have a special scrap collection day or week—pile up your scrap and call your nearest junk or scrap dealer. He'll pay you for it and start it on its way to a steel manufacturer.

REPUBLIC STEEL — PRODUCTION FOR VICTORY

This Advertisement Sponsored by

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division • Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company • Export Department: Chrysler Building, New York, New York

In Cooperation with the U. S. Government's Salvage Campaign

FOR VICTORY TODAY AND SOUND BUSINESS TOMORROW

Get This Flag Flying Now!

This War Savings Flag which flies today over companies, large and small, all across the land means *business.* It means, first, that 10% of the company's gross pay roll is being invested in War Bonds by the workers voluntarily.

It also means that the employees of all these companies are doing their part for Victory . . . by helping to buy the guns, tanks, and planes that America and her allies *must* have to win.

It means that billions of dollars are being diverted from "bidding" for the constantly shrinking stock of goods available, thus putting a brake on inflation. And it means that billions of dollars will be held in readiness for post-war readjustment.

Think what 10% of the national income, saved in War Bonds now, month after month, can buy when the war ends!

For Victory today . . . and prosperity *tomorrow,* keep the War Bond Pay-roll Savings Plan rolling in *your* firm. Get that flag flying now! Your State War Savings Staff Administrator will gladly explain how you may do so.

If your firm has not already installed the Payroll Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write or wire: War Savings Staff, Section F, Treasury Department, 709 Twelfth Street NW., Washington, D. C.

Save With

War Savings Bonds

This Space Is a Contribution to America's All-Out War Program by

AMERICAN ARTISAN

Air Control offers

★ ★ ★ ★

A Complete Line of REGISTERS

FOR DEFENSE HOUSING AND REPAIR NEEDS

—The AIR CONTROL line assures your every register need—THREE complete lines of forced air registers and grilles, Gravity registers, floor registers and grilles, and damper control sets.

FORCED AIR REGISTERS AND GRILLES—Low priced adjustable fin registers—ideal for low cost defense housing. Dual control registers give ideal performance at a moderate price.

GRAVITY REGISTERS—ideal for defense housing or replacement.

FLOOR REGISTERS AND FACES—grid type construction insures long life and durability for low cost housing and replacement.

AIR CONTROL offers a register for your every need. Complete stocks assure immediate delivery.

Do you have a copy of the latest AIR CONTROL Catalog No. 42? Call your nearest AIR CONTROL Jobber or write direct—this complete catalog will be sent to you at once.

also ARMS for AMERICA'S FIGHTING FORCES

Air Control Products, Inc.

COOPERSVILLE • MICHIGAN

Casualty—1,000 miles from the enemy

ALMOST as fatal as a bullet or a shell is the breakdown in the spirit of a sailor or a soldier.

Our men have the finest spirit in the world. But it must be maintained in the American way.

They must not be made to feel that they are mere automatons, fighting machines, as the armed forces of the dictators have been made to feel.

Life in our navy and army is hard. Discipline is tough. It must be. But there also must be moments when the sailor or soldier is treated as Mr. Somebody-or-other.

That's where the USO comes in. For the USO is the banding together of six great agencies to serve one great purpose—to see that our boys in the camps and naval stations have a place to go, to turn to, a "home away from home."

The duties of the USO have more than doubled during the year. It must serve millions more men. Its field of operations has been enlarged to include many parts of the world.

To carry on its important work, the USO must raise $32,000,000. It needs your contribution. No matter how small you make that contribution, the USO needs it. And it needs it *now*.

You are beset by requests for help on all sides. By all means, try to meet those requests. But among them, don't neglect the USO.

Send your contribution to your local USO committee, or to USO, National Headquarters, Empire State Building, New York.

Give to the USO

ALL-ABOARD!
WILL FURNACE "CLOG-ITIS" COST YOU MONEY AND WASTE FUEL?
FURNACE "RED HOT"? YET HOUSE CHILLY?
DON'T LET YOUR FURNACE BECOME A "FUEL HOG"!
HAS YOUR FURNACE LOST ITS "PEP"?
FIBERGLAS*
DUSTOP*
AIR FILTERS

Hitch your business to this powerful Dust-Stop National Advertising

FLASH!...There goes the starting signal...another Dust-Stop* fall consumer-advertising campaign gets under way *this month.*

National advertising starts in The Saturday Evening Post, Life, Better Homes and Gardens, and American Home . . . and it's all yours for the using.

Millions will learn about Dust-Stop Advantages

This nation-wide advertising will be read by millions of householders . . . it is sure to prove a real business snapper-upper for all dealers who co-operate. Here's the story . . .

Many home owners are wondering right now about this year's heating problems. They are all set to do something . . . but what?

Well, along comes Dust-Stop advertising. It explains about clean, dust-free heat . . . it tells what Dust-Stops offer in maintaining maximum heating efficiency. And, it stresses the fuel savings made possible by clean filters.

Send for Dust-Stop's FREE Dealer-Helps

Naturally, many of these readers are going to be wide-open prospects for their nearest Dust-Stop dealers . . . and that's where you come in.

Get the full set of free Dust-Stop Dealer-Helps . . . let everybody know that *your* place is local headquarters for Dust-Stop* Fiberglas* Air Filters.

5 MONTH CAMPAIGN IN THESE LEADING MAGAZINES

MEAN 57,319,145 ADVERTISEMENTS WORKING FOR YOU...

Place the attractive advertisements (complete mats furnished free) in your newspapers. Send out the colorful mailing pieces (your name and address imprinted on each one without charge) to a big list of home owners. Then put up the smart Dust-Stop window displays and counter cards.

You'll get more than Dust-Stop replacement profits too. You will find plenty of furnace repair work that needs your tools and skill when you get into basements to put in new Dust-Stops.

But <u>don't</u> delay

Remember, Dust-Stop National Advertising begins this month. Right now is the time to co-operate. Your distributor will gladly show you the new 1942 sales plan—"Pulling Profits out of the Air." Get in touch with him today. *Owens-Corning Fiberglas Corporation, Toledo, Ohio. In Canada, Fiberglas, Canada, Ltd., Oshawa, Ontario.*

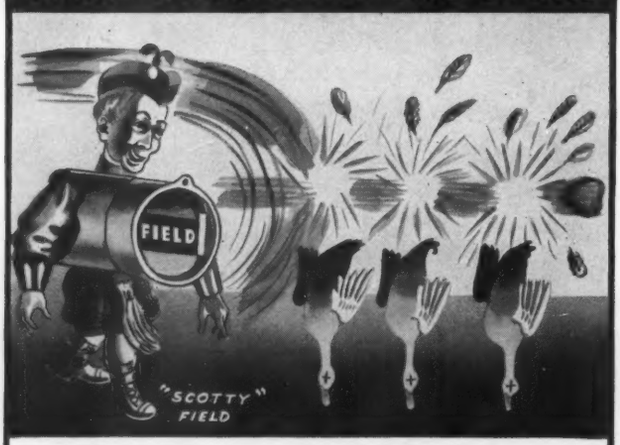
FIBERGLAS*

DUSTOP*

*T. M. Reg. U.S. Pat. Off.

AIR FILTERS

THREE BIRDS WITH ONE STONE



Field Controls

Help WAR-RESTRICTED DEALERS To Serve Their Country, Their Customers And Themselves MORE Effectively

WITH each FIELD installation, YOU make a worthwhile profit, YOUR CUSTOMER reduces his fuel consumption from 5% to 25%, and YOUR UNCLE SAM gains too! To Uncle Sam each installation means MORE FUEL for strictly War Production needs; MORE SPACE in over-burdened tankers and railroad cars for strictly war consignments. . . . — IF your heating line is restricted, FIELD CONTROLS offer the opportunity to keep sales and profits UP! There is a FIELD CONTROL for every installation — from the largest industrial boiler down to the smallest residential space heater — coal, oil or gas. . . . — Wouldn't you like full information on this fast-selling, easily installed line?

9 Out of 10 Heating Plants Need A Field Draft Control - Savings Usually Effected Range From 5% Up To 25%

COMMERCIAL

TYPE M

6" TYPE U

TYPE K

FIELD CONTROL DIVISION MENDOTA, ILLINOIS

CONVENTIONS

Oct. 12-16—National Metal Exposition. Cleveland. Convention Hall.

Oct. 19-20—National Association of Sheet Metal Distributors. Semi-Annual. Palmer House, Chicago.

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 85.

291—We're All in the Same Boat

The Commercial Shearing and Stamping Company, Youngstown, Ohio, is distributing a 4-page folder entitled "We're All in the Same Boat," listing their products—steel tunnel lining, circular shapes of all types, fabricated and welded parts, furnace heads and stampings, tank heads and accessories, fan housings, medium and heavy stampings in all shapes, steel pallets for the concrete block industry, and hydraulic equipment (pumps, valves and hoists). The third page mentions slow deliveries, doing the best possible to keep everybody happy under very trying conditions, and since we are all in the same boat, "Let's pull together and win."

◆

292—Cat. 118—Automatic Heating Accessories

Robert Barclay, Inc., 122 North Peoria St., Chicago, wholesale distributors of automaic heating accessories, is distributing Catalog No. 118, Winter 1942-43.

A full page index covers the products offered. The cover warns "Fuel is ammunition—don't let it be wasted! Conserve with testing equipment, combustion baffles, vacuum cleaners, efficient parts, draft regulators. Aid the war effort and increase your profits from service."

◆

293—Press Brakes

The Cincinnati Shaper Company, Hopple, Gerard & Elam, Cincinnati, has printed a treatise on Press Brakes and their uses. This 64-page catalog is largely devoted to pictures showing press brake applications, bending and punching load charts, features for special work, and pages of dies and their uses.

◆

294—U. S. Register Plant Facilities

United States Register Co., Battle Creek, Michigan, has published a 24-page booklet covering their corporate and financial structure, facilities and factory equipment, and shipping facilities. Their main production plant is located at Battle Creek, Michigan, with branches in Minneapolis, Kansas City and Albany, New York.

There is a view of the main factory, fourteen interior views, and a complete list of the equipment—presses, shears, welders, sheet metal machinery, polishers, paint and spraying equipment, cleaning and plating equipment, miscellaneous equipment and tool room equipment—streamlined for war production.

◆

295—Drive for More Production

The Office of War Information, of which Phil H. Stitt is Chief of the Business Press Unit News Bureau, Room 3540 Social Security Building, Washington, offers thirteen posters in various sizes to inspire war workers to greater efforts for **More Production.**

Ten-foot streamers bearing such legends as "Every Minute Counts," and "Time is Short" are supplied to labor-management committees.

Sound film on a large number of subjects related to war production are available at a small fee.

Transcription service for plants with loud speakers or participating in local radio programs, ranging from 1¼-minute recording the Star Spangled Banner to a 30-minute dramatization of the Victory Ship program are offered. Most of the transcriptions are 5 to 6 minutes.

Labor-Management Committees in various plants are invited to report to War Production Drive Headquarters for stickers, a copy of the Official Plan Book and the Handbook of Helpful Services.

COLD AIR RETURNS

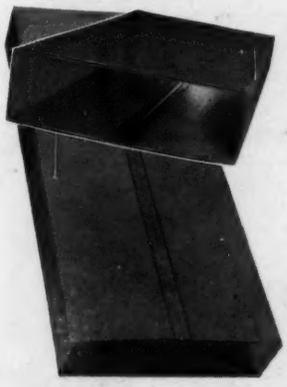
In their original flat form, you merely nail the 33" or 16½" wide A.R.A. Sheets to the bottom of joists to form Cold Air Return Ducts.

THE PACKAGE

A.R.A. Sheets are shipped in an easy-to-handle carton weighing about 100 lbs. There are 20 Sheets 33" wide x 48" or 40 Sheets 16½" wide x 48" packed to a carton.

DUCTS

You can cut A.R.A. Sheets into panels and fabricate them into duct work by using scrap metal for the corners and joints. The metal pieces can be attached to the A.R.A. Sheets with ordinary sheet metal screws.



DUCTS

By "setting" your brake to allow for the 3/16" thickness of A.R.A. Sheets, you can fold or bend at right angles to form small one-piece ducts or stacks. A pre-formed metal seam may be used for the long joint or the butt joints.

GRANT WILSON, INCORPORATED

Insulation and Fireproof Materials

4101 West Taylor Street Chicago, Illinois

phone's - KEDZIE 3150

An Open Letter to the
Sheet Metal Tradesmen

Subject: SUBSTITUTES FOR SHEET STEEL

Dear Friends:

Inasmuch as we were the first to come to your help by producing an acceptable 'Sheet Steel Substitute', we feel, we should declare our position to you.

We have no desire to replace the steel mills in your Industry. The shortage of steel is unfortunate for you and for them. We do desire, however, to serve you during this critical period so that you may remain in your business. We will leave entirely to you the decision of what material you will use after the War is won.

You are craftsmen, skilled in the fabrication of fittings and duct work and we believe that the fabricating of fittings and duct work belongs to you. It is our aim to supply you with the best available material from which YOU can do this fabricating work in your own shops, using your own tools and your own trained and skilled abilities.

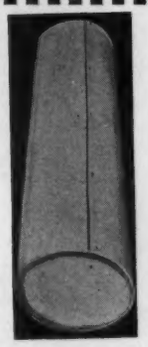
Our prime object in producing A-R-A Sheets for you is to give you now a substitute that not only includes attractive appearance and long satisfactory service but, more important, a sheet with such characteristics that it can be worked successfully in your shops and with your tools.

So long as we are permitted to do so, we will continue serving you with the finest Asbestos and Insulating Materials it is possible to produce so that we may always be your source of supply rather than your competitor.

I do also want to thank you for your generously expressed confidence and approval of our products and our policy.

Sincerely,
Grant V. Wilson
Grant V. Wilson
President

GVW:ES

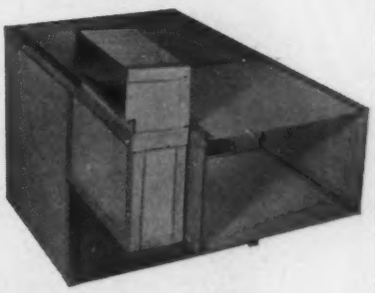


ROUND PIPE

You can roll A.R.A. Sheets on your own rollers into smooth, strong, round pipe. A standard metal seam can be used for the long joint and a sleeve of A.R.A. Sheets or metal can be used for the butt joints.

FITTINGS

Right in your own shop and with your own tools you can completely fabricate A.R.A. Sheets into fittings using no sheet metal.



FITTINGS

Intricate and complicated fittings can be easily fabricated in your own shop using a minimum of metal.

Insist on getting genuine A. R. A. Sheets from your jobber

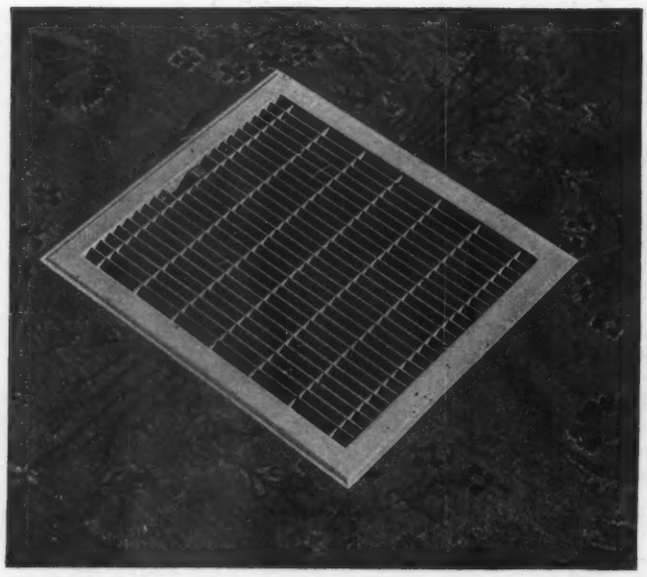


Fig. DR—DuraBilt Register

DURABILT
Floor Registers and Cold Air Faces

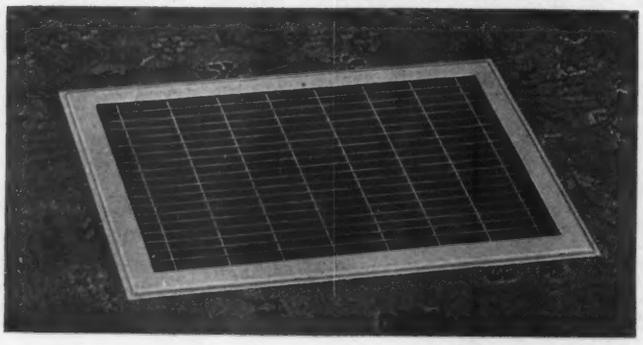
Extra service is built into the sturdy DuraBilt Model—yet it is priced within the cost restrictions of the small-home market. These registers and intakes are accurately assembled with heavy flat steel bars, mortised and interlocked at every cross-joint. This grille assembly is tenoned and locked tightly into welded and reinforced frame, making a highly rigid and durable construction. Open area is 81%. Furnished in narrow mesh as standard for all sizes. The 7/16" by 1-15/16" opening is heel-proof, excludes small objects such as chair legs, and tends to conceal the register box interior. For structural strength—use DuraBilt Registers and Intakes.

Write for complete Auer Register Book 41 showing all models for air conditioning and warm air systems. Special Grille Catalog "G" also sent on request.

The Auer Register Co. 3608 Payne Ave., Cleveland, O.

AUER REGISTERS & GRILLES
For Air Conditioning *and* Gravity

Fig. DSC—DuraBilt Cold Air Face



THIS is more than a war of mechanical monsters clashing in the night . . . more than a war of production.

It is a war for markets—*your* markets! The Axis wants your business—wants to destroy it for once and all.

With so much at stake, there is no doubt you will want to do everything you can to meet this Axis threat. Two ways are open: Speed production and BUY BONDS. The only answer to enemy tanks and planes is *more* American tanks and planes—and your regular, month-by-month purchases of Defense Bonds will help supply them. Buy now *and keep buying*.

• HOW THE PAY-ROLL SAVINGS PLAN HELPS

When you install the Pay-Roll Savings Plan (approved by organized labor), you not only perform a service for your country but for your *employees*. Simple to install, the Plan provides for regular purchases of Defense Bonds through voluntary pay roll allotments.

Write for details *today!* Treasury Department, Section R, 709 Twelfth Street, NW., Washington, D. C.

U. S. SAVINGS

Bonds * Stamps

This space is a contribution to Victory by

AMERICAN ARTISAN

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on this page.

297—Metal Duplicating Without Dies

O'Neil-Irwin Manufacturing Company, 316 Eighth Avenue South, Minneapolis, offers their revised Di-Acro Catalog No. 42-2, outlining their system of metal duplicating without dies.

Two new and additional Di-Acro products—The DiAcro brake No. 3 of 18-in. capacity and the Di-Acro Shear No. 2 of 9-in. capacity—are included.

◆

298—Venturi-Flo Overhead Diffusers

Barber-Colman Company, River & Loomis Streets, Rockford, Illinois, has prepared a new catalog illustrating and describing in detail the functions and construction of the Venturi-Flo overhead type air diffusers.

Information is included on the recessed type, the surface type, the flush type and the thermostatically controlled type for extreme mounting heights. Engineering data for the exact determination of sizes and types to meet all varying conditions is a supplement to this catalog.

◆

299—Plastipitch

Coated Products Corporation, Verona, Pa., is distributing a 6-page folder covering Plastipitch—a method of weather-proofing many types of prefabricated metals and shapes. Plastipitch coating is resistant to water, sunlight, smoke, alkaline, acid, and other corrosive atmospheric conditions.

A clean, flat or preformed sheet or part is dipped into a tank containing Plastipitch and brought to the same temperature as the coating material in order to assure a perfect bond. The sheet or part is withdrawn from the tank at a controlled rate, to regulate coating thickness and produce a sheet uniformly coated on both sides.

◆

300—Arc Welding Design and Practice

The Lincoln Electric Company, 12818 Coit Road, Cleveland, has produced a seventh edition of "Procedure Handbook of Arc Welding Design and Practice"—1,308 pages, 6 x 9 inches, 1,810 illustrations, including photos and drawings; cover semi-flexible simulated leather, gold embossed, price postpaid United States $1.50 a copy, elsewhere $2.00.

Authors have made every effort to provide complete and up-to-date information to help the men in the shops, shipyards, airplane factories, ordnance plants and arsenals produce to the fullest extent to defeat the Axis.

◆

Domestic Draft-O-Stat—The Hotstream Heater Co., Combustion Equipment Division, 8007 Grand Avenue, Cleveland, offers a 4-page folder covering the new Model "B" and Model "BM" (Motorized) domestic Draft-O-Stat for automatic and manual coal firing. . . . **Coupon No. 301.**

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

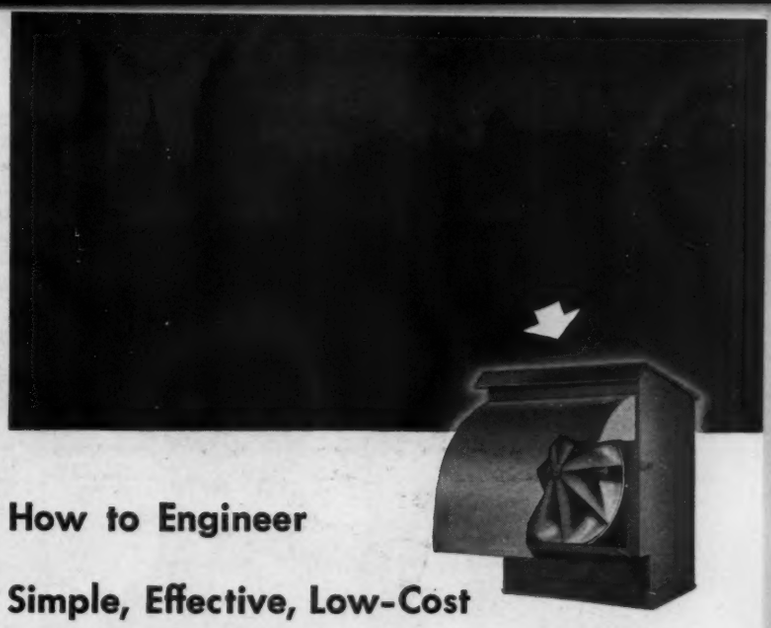
89	90	91	92	93	94	95	96
97	98	99	100	101			
291	292	293	294	295	296	297	298
299	300	301					

Name .....

Company .....

Address .....

Are you Manufacturer——Jobber——Dealer——

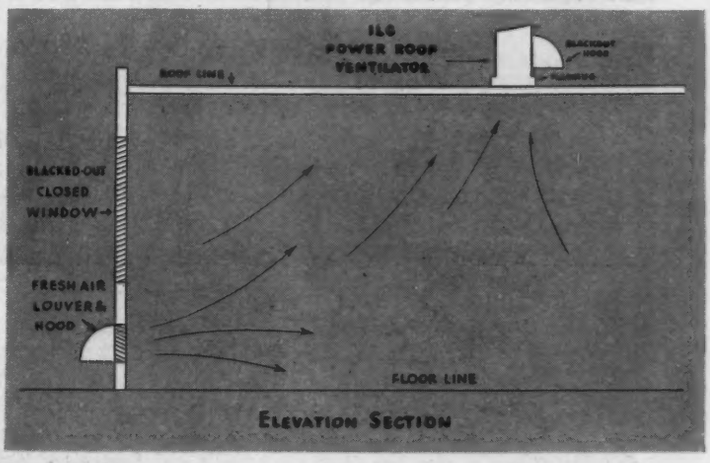


How to Engineer

Simple, Effective, Low-Cost

BLACKOUT VENTILATION

As windows are blacked-out and closed in war-crowded plants and offices, adequate ventilation becomes a *"must"!* Excessive heat, "worn-out" air, odors, smoke, steam, dust, fumes, etc., *must* be rapidly removed . . . fresh, invigorating air *must* be supplied to speeding workers . . . without transmitting light! To help you solve this modern problem, Ilg has developed the simple, effective, low-cost system illustrated below which not only handles emergency ventilation today, but will be in operation long years hence for normal air change requirements.



ELEVATION SECTION

FREE . . . BLACKOUT BULLETIN!

New Bulletin No. 304 gives you the complete story . . . get it today. If you are faced with a specific job right now, write, wire or phone for dimension drawings on blackout hoods (to be quickly, easily fabricated on location) for standard Ilg Power Roof Ventilators, also Fresh Air Inlets.

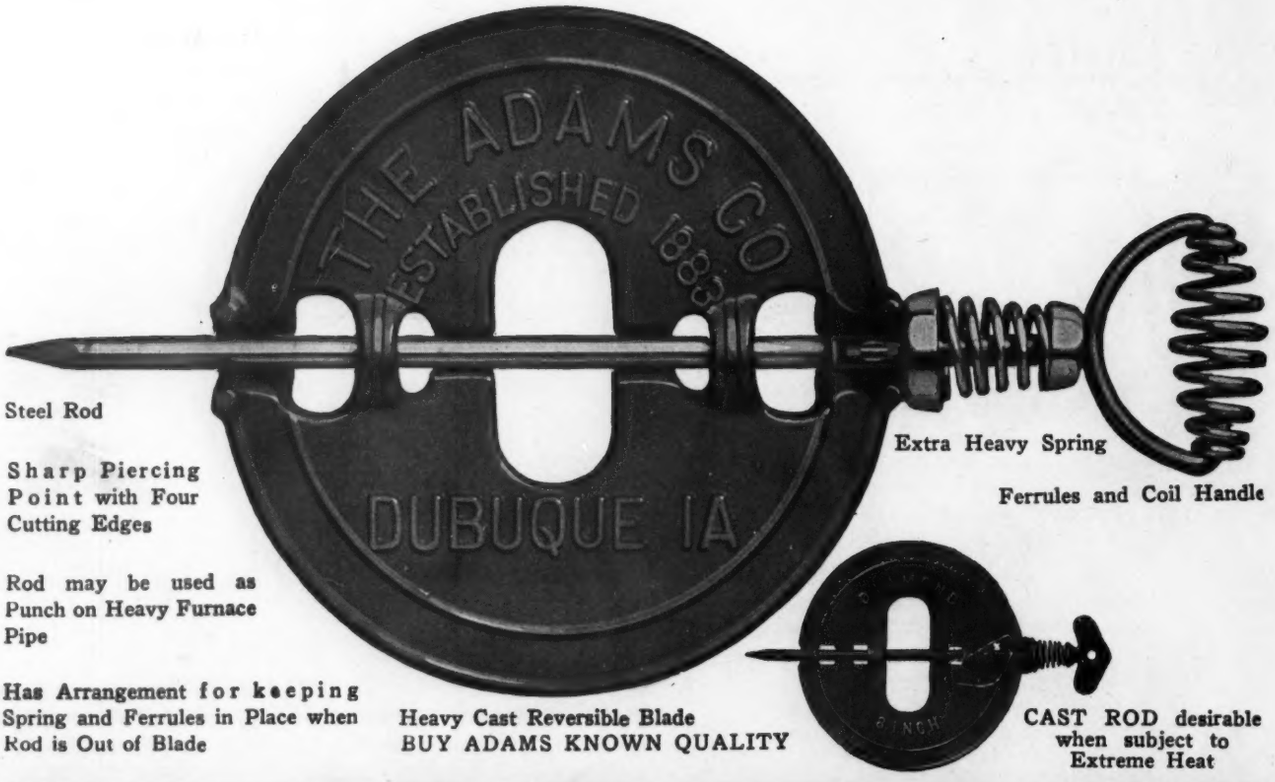
ILG ELECTRIC VENTILATING CO., 2871 N. CRAWFORD AVE., CHICAGO, ILL.
OFFICES IN 40 PRINCIPAL CITIES CONSULT YOUR PHONE DIRECTORY

ILG

Vitalized Ventilation

AND AIR CONDITIONING

AIR CHANGE . . . NOT JUST AIR MOVEMENT!



Steel Rod

Sharp Piercing Point with Four Cutting Edges

Rod may be used as Punch on Heavy Furnace Pipe

Has Arrangement for keeping Spring and Ferrules in Place when Rod is Out of Blade

Heavy Cast Reversible Blade
BUY ADAMS KNOWN QUALITY

Extra Heavy Spring

Ferrules and Coil Handle

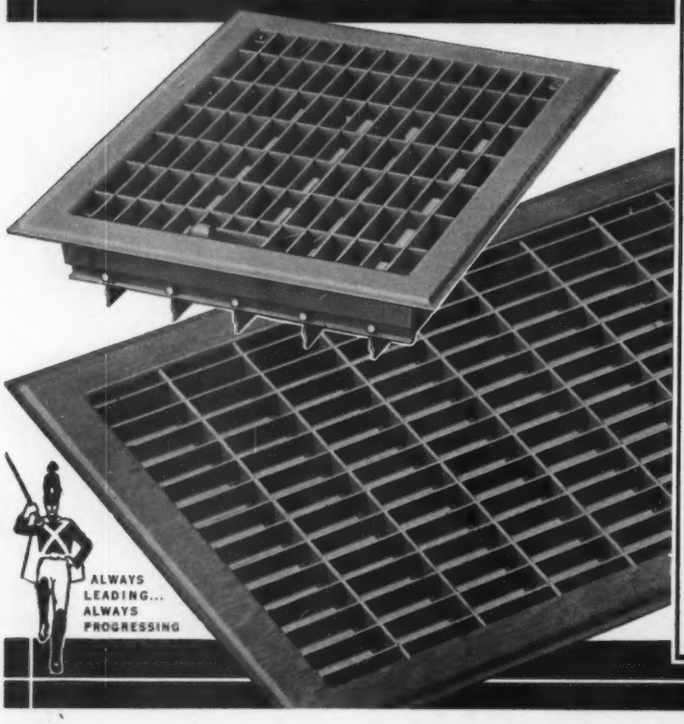
CAST ROD desirable when subject to Extreme Heat

DIAMOND SMOKE PIPE DAMPER

Manufactured by THE ADAMS COMPANY Dubuque, Iowa, U.S.A.

ESTABLISHED 1883

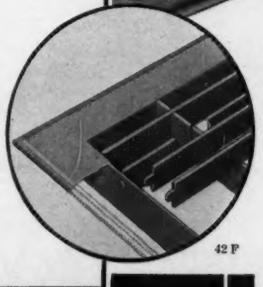
INDEPENDENT "Fabrikated" REG. U. S. PAT. OFF.



REGISTERS AND COLD AIR FACES

Great strength, rigidity and large open area are attained with "Fabrikated" construction. The steel outer frame is welded to form a solid piece and the interior is made of steel strips set on edge, the same as the girders of a bridge. The faces are straight, the intersecting joints tight. Made in standard and close mesh.

The interior grille is forced together under heavy pressure making it substantially one solid piece. Ends are clinched outside the frame so that each member is a sustaining unit.



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THE INDEPENDENT REGISTER CO.
3747 E. 93d St., Cleveland, Ohio

42 F

Association Activities . . .

Detroit

The August announcement of The Detroit Association of Warm Air Heating and Air Conditioning Contractors, Inc., Fort Shelby Hotel, calls the attention of the members to the fact that the association has a Board of Directors, a Labor Committee and a set of Officers working for the association. Members (whether union shop or not) are invited to attend the meetings and listen carefully to the report of the Labor Committee.

The Greater Detroit Builders have signed a closed shop agreement with the Building Trades Council.

Robert Look of the Gas Burner Service Company is now in the service. Former member Duweke of the Duweke Heating Company is in the air patrol in this district. Ed Kreider, president of the School Board of East Detroit, awarded diplomas at the recent graduation exercises.

At the last Board meeting Jerry Beecraft of Atlas was elected to fill out Cliff Stork's term.

Marshall Van Assche, Secy.

◆

Florida

The August 15 copy of "The Florida Roofer" published by The Roofing and Sheet Metal Contractors Association of Florida, discusses competition between the lumber dealer who sells roofing materials to home-owners and then recommends an individual who can make the installation, and the established roofing and sheet metal contractor vs. the itinerant salesman of roofing. The attention of members is called to the **American Roofer** discussion of lumber dealer competition as it evolves.

The main points for the established roofing and sheet metal contractor to remember are that he must maintain a high standard of service, establish a fair price for the best work which he and his employees can perform, be available for prospective customers, and practice fair competition with other established roofing and sheet metal contractors. All the advertising that a lumber dealer may do will never make him a roofing contractor.

Insurance rates, as a result of association activities with the Florida Insurance Commission, have been reduced 10.8 per cent, which will make a difference of about $43.50 per $5,000 payroll.

Next to **Happiness**, the word **Satisfaction** expresses most of what human beings wish and hope for. The policy of guaranteeing full satisfaction to customers in all dealings will bring success—more than any other single factor.

L. A. Burgess, Secretary.

◆

Rochester, New York

The Sheet Metal, Roofing, Heating & Air Conditioning Contractors Association of Rochester, N. Y., enjoyed a boat trip to Cobourg on July 16, with 55 Rochester and Western New York contractors, jobbers and salesmen on the boat. The day was beautiful, the voyage smooth, the meals excellent and the private bar busy every minute. The boat left Genesee Dock at 9 a. m. and returned at 9:00 p. m.

The Committee consisted of Wm. A. Newbauer, Chairman, Walter Schoeneman, Arrangements, Orville Brandt, Refreshments, August Beikirch, Jr., Sports, and Clarence Williams, Tickets.

A 4-inning ball game was played in Canada and won by the Sales-Jobber team by a close margin and with the **help of the umpire.**

At the evening dinner prizes were awarded for deck sports, ball game, etc. Prizes consisted of cash, cigars and Eversharp Repeater pencils, and, of course, the ball and bat.

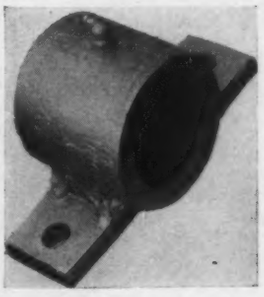
The trip is so popular that the association has inquiries away ahead of time as to when it is scheduled.

Clarence T. Williams, Tickets,
644 University Ave., Rochester.

Get in there and

WELD!

Here are ways you can put the heat on the Axis with the welding arc:



Conserve Steel! With Lincoln Welding, you can build machine parts and special equipment from scrap steel. Example: This drum shaft bearing, welded from 3″ pipe and ½″ x 2″ bar, then fitted with bushing as shown.

Save Time! Special equipment such as this oil well mud sampler can be Lincoln welded in half the time formerly required. Saves vital man-hours.

WRONG RIGHT

And When You Weld: Burn off electrodes to a 2″ stub end to save this valuable material. Other suggestions for aiding the war effort contained in "Welding Profits," issued periodically. Free on request.

THE LINCOLN ELECTRIC COMPANY

Cleveland, Ohio

Largest Manufacturers of Arc Welding Equipment in the World

Sign of Wartime

FUEL CONSERVATION

in Thousands of Homes

Dependable Controls . . .

Here's one way YOU can help stretch America's Fuel Supply even farther—help lift the load from our overburdened transportation facilities—render a real service to your customers . . . NOW, before cold weather starts, inspect, adjust, repair your heaters now in use. Replace with new A-P Controls where possible.

On New Wartime Building Projects . . .

Be sure to contact your local Defense Housing Contractors, FHA Offices and FPHA—tell them about A-P DEPENDABLE CONTROLS for Gravity Fed Oil Burning Heaters and Furnaces. Dependable, trouble-free service of A-P Oil Control Valves is welcome assurance of fuel conservation so essential to our Nation's War efforts.

A-P Model 240-Q, Temperature Limited Furnace Control.

AUTOMATIC PRODUCTS COMPANY
2452 NORTH THIRTY — SECOND STREET
MILWAUKEE WISCONSIN

DEPENDABLE *Oil Control Valves*

With the Manufacturers . . .

Pacific-Airmax Merger

Helen A. Hartfield, president of Pacific Gas Radiator Company, and R. C. Gross, president of Airmax Corporation announce the merger of Airmax Corporation, San Diego, California, manufacturers of aircraft heating equipment, with Pacific Gas Radiator Company, Huntington Park, California, under the new firm name of Pacific-Airmax Corporation.

All Airmax products will now be manufactured in the plant and foundry of the Pacific Gas Radiator Company at Huntington Park. General offices of Pacific-Airmax Corporation will be located at the Huntington Park plant.

Established more than 29 years ago for the manufacture of residential, commercial and industrial gas heating and ventilating equipment, the Pacific Gas Radiator Company plant is ideally suited to the manufacture of Airmax products.

R. C. Gross, president of Airmax Corporation has been appointed vice president and general manager of Pacific-Airmax Corporation and A. A. Arnhym, also of Airmax, will be chief engineer.

Plans are already under way for complete redesigning and improvement of the line of Pacific residential, commercial and industrial gas heating equipment for peace time uses, and new products.

Officers of Pacific-Airmax Corporation include: Helen A. Hartfield, president; R. C. Gross, vice president and general manager; Helen A. Wilke, secretary and treasurer; L. M. Hull, sales manager; A. A. Arnhym, chief engineer; E. M. Rahm, work manager and J. B. Marchand purchasing agent.

◆

Strippit in Larger Quarters

The Strippit Corporation, 1200 Niagara Street, Buffalo, New York, has purchased a very modern building of steel and concrete construction at 345 Payne Avenue, North Tonawanda, New York, according to an announcement by George F. Wales, President. North Tonawanda is about half way between Buffalo and Niagara Falls.

The new building has considerably more floor space and is ideal for modern production line technique in manufacturing Wales high quality punching and notching equipment. Ample land surrounding the building provides space for later enlargement of the present building. One side of this building is adjacent to the main New York Central line providing siding facilites.

Wales self-contained punching and notching units can be set and reset in series of patterns on templates, T-slotted plates or press brake rails for punching patterns on sheets, channels, bulb angles and shapes. The punch and die are built into the holder to keep the punch and die in constant, perfect alignment. Nothing is attached to the ram of the press—a feature that cuts die setting time from hours to minutes. In addition, Strippit manufactures strippits, T-slotted plates and press brake accessories.

◆

John McGrath

John McGrath, father of W. L. McGrath, vice president of Williamson Heater Company, Cincinnati, passed away on August 13.

◆

The Hays Corporation, Michigan City, Indiana, manufacturers of combustion instruments and control, announces the appointment of the **Energy Control Company** in Philadelphia, succeeding the Paul B. Huyette Company, Inc.

Engineering Products Company, F. E. Anderson, Manager, has been appointed to the Southern West Virginia field with headquarters at Charleston, 304 Davidson Building.

Power Specialty Company, O. W. Muller, Manager, with headquarters at 25 North Live Oak Street, Houston, Texas, is covering the southeastern Texas territory.

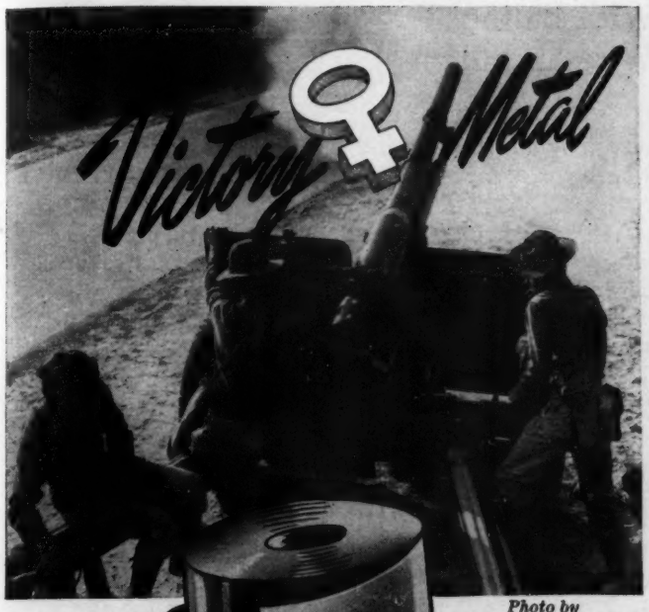


Photo by U. S. Army Signal Corps

HUSSEY COPPER

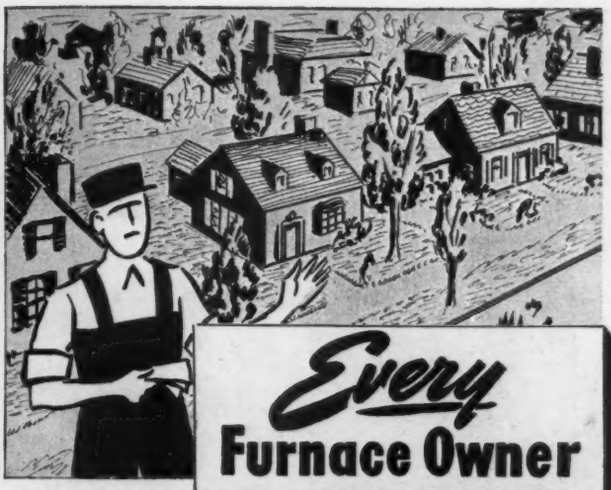
AN INDISPENSABLE ALLY IN WAR

The big guns depend on copper! Barrels wear longer, and accuracy is greater all because small copper bands on the projectiles reduce friction on the rifling . . . yet provide a tooth to mesh with the barrel rifles which set up the rotating action of the projectile that is so necessary to marksmanship.

Copper is serving Victory in ways that no other metal could serve; that's why Hussey Copper is literally fighting on every American front.

HUSSEY

C. G. HUSSEY AND COMPANY
(Division of Copper Range Co.)
Rolling Mills and General Offices: PITTSBURGH, PA.
Warehouses in Principal Cities



Every Furnace Owner A PROSPECT for FIRELINE!

WHETHER the furnace is in good condition or not, whether it has a cracked, burned-out firepot or a good one, every furnace owner wants to get the most heat out of the fuel he buys and to protect his firepot from the damage of overheating.

Even steel furnaces need Fireline to replace cracked or burned-out fire brick.

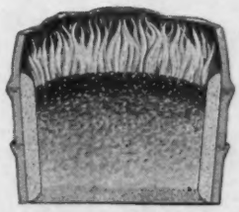
FIRELINE is one product you can get NOW and sell under present war conditions. Your helper can install it in a few hours without taking down the furnace and make a nice profit for you on every job.

Send for information on how to get this business right now.

REPAIRS CRACKED FIREPOTS

You merely tamp it into place around the firepot and trim it with a trowel. It seals all cracks and holes in the firepot castings. Protects good castings against fire damage.

SAVES FUEL!



A Fireline refractory lining in the firepot radiates the heat across the entire fuel bed. The result is complete combustion of all the fuel; no unburned coal in the ashes. Eliminates smoke, soot, and dirt.

FIRELINE STOVE & FURNACE LINING CO.
1816 Kingsbury St. Chicago, Illinois

KNOW AIR CONDITIONING

Send Today
for
Samuel R. Lewis'

"AIR CONDITIONING FOR COMFORT"

Third Edition
288 Pages—Illustrated
$2.00

Here is a book that presents—in simple, readily understandable form—every kind of information necessary for an accurate and thorough knowledge of air conditioning principles, equipment, and practices. Written by S. R. Lewis, a widely-known consulting engineer who has been active in air conditioning work for more than thirty years, it deals with all angles of the air conditioning subject from the practicing engineer's viewpoint. The designing procedures explained in the book are, for example, in every detail the same procedures employed today by the author's own organization.

Featuring this third edition are several entirely new chapters on phases of the subject not previously treated, including noise control, air conditioning measurements, air conditioning standards, fire protection codes and operating suggestions. Brand new designing examples are also used, together with new forms for recording the design data, the proper filling-in of which is explained step-by-step.

OF VALUE BOTH AS
A REFERENCE AND TEXT

Engineers in air conditioning will find the new "Air Conditioning for Comfort" invaluable as a reference book, while salesmen, students, and others may rely on it to give them a clear knowledge of fundamentals, and of the latest air conditioning methods and equipment.

Send for a copy today. We know you will consider this volume the most readable and complete book on the air conditioning science you have yet seen. You will risk nothing in ordering a copy, for you will be privileged to return it for a refund if for any reason it should prove unsatisfactory. Order your copy now.

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave. Chicago, Ill.

With Baling Wire and Gum

(*Continued from page* 21)

air, air conditioning and a long list of appliances which go along with and are a part of modern comfort.

We have in many, many instances thrust aside all the things we learned in twenty years of research in favor of letting the manufacturer do our technical work through the modern equipment he developed for us.

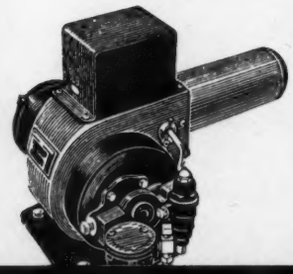
Now the time has come for us to use all the things we know about heating plants and heating methods. Particularly all the engineering knowledge which makes old furnaces, poor installations, neglected installations operate at maximum efficiency.

Generally speaking, these unsatisfactory systems can be made satisfactory by a little intelligent "tinkering" plus the application of adjuncts like storm windows, weather-stripping, insulation, more returns or better returns, better piping—all of which are either non-priority or can be made over from materials already in the system.

Keeping these 10 million furnaces operating at highest efficiency; keeping these 10 million home owners comfortable this winter is a man's sized job. Are we men or have we just been kidding ourselves?

"SUPPLIERS TO UNCLE SAM"

"KNOW-HOW"



● You hear a lot these days about "know-how"... an industry's grand total of specialized experience. Quiet May's total is grand indeed ... reason enough for our vital role in war production. Reason, too, for America's confidence in the peacetime products, past and future, that bear the name of MAY. May Oil Burner Corporation, Baltimore, Maryland.

QUIET MAY OIL BURNERS

Interpretations and Amendments

(*Continued from page 33*)

Interpretation to L-41

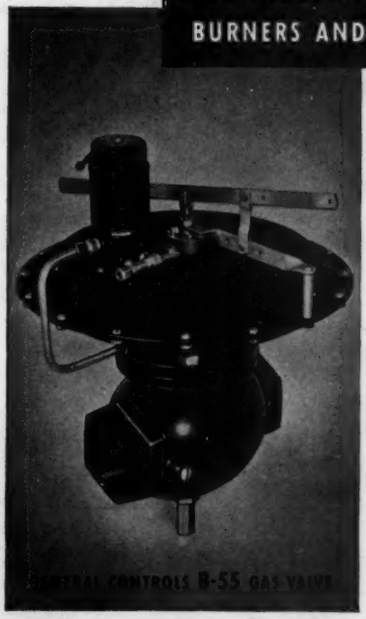
L-41 is the stop construction order under which it is necessary for an owner or a builder to obtain WPB approval to begin construction of or begin alteration on a house if the cost exceeds $500; or on a agricultural building (not house) if the cost exceeds $1,000; or on a commercial building if the cost exceeds $5,000—during any continuous 12-month period.

(See May, 1942 American Artisan, page 30, for explanation and questions and answers.)

A recent interpretation which may be useful states that—any project under L-41 having the above WPB approval does not have to be included in cost of the quota in the 12-month period. In other words, a householder may get approval for $500 worth of new heating equipment and can order an additional $500 worth of heating equipment without approval making a total amount permissible within 12 months of $1,000. Agricultural construction can be $1,000 approved, plus $1,000 permitted; total $2,000. Commercial or industrial $5,000 approved, plus $5,000 permitted; total $10,000.

(A previous interpretation covering use of used material appeared on page 18, July, 1942 American Artisan).

THE ONE CONTROL THAT MEETS ALL YOUR REQUIREMENTS FOR INDUSTRIAL & COMMERCIAL BURNERS AND FURNACES . . . . .



★ Opening time adjustable, 5 to 60 seconds.

★ Widest range in pressures. Handles up to 5 lbs.

★ Widest range of sizes. Available from ¾" to 6" I.P.S. for manufactured, natural or l.p.g. gases.

★ Ample power is available for louvre control. Damper arm easily rotated to any desired position.

★ Low current consumption. In sizes up to 1½" I.P.S., uses but 8 watts.

★ Ask For New Bulletin. Write for your copy of the new 12-page gas control bulletin just off the press. Use it as your buyer's guide.

GENERAL CONTROLS

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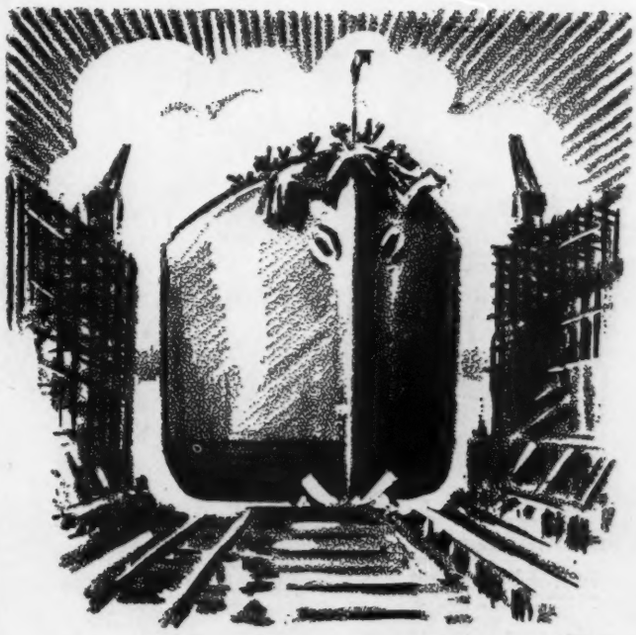
New York • Boston • Philadelphia • Cleveland
Detroit • Chicago • Dallas • San Francisco



HOW LOCKFORMER HELPS TO LAUNCH 'EM AHEAD OF SCHEDULE!

LOCKFORMERS make Pittsburgh Locks, Double Seam Locks, Drive Cleats and Right Angle Flanges—

——in a fraction of the time required by hand methods!

Even your newest apprentice can expertly operate Lockformers after five minutes' instruction.

One man and a Lockformer can make more Pittsburgh locks than sixteen men working at eight brakes.

Speed up the War Program in your own shop. Write or wire for the Lockformer Catalog.

The LOCKFORMER *Co.*

4617 ARTHINGTON STREET, CHICAGO, ILLINOIS

Announcing

THE IMPROVED

¼ INCH

SKILDRILL

- RUNS QUIETER
- STAYS COOLER
- DRILLS HOLES FASTER!

THESE SPECIAL FEATURES

- New Quieter, Smoother Gearing!
- New Improved Cooling System!
- 4 Speeds Available!

For fastest drilling on any material

1800 R.P.M. 2500 R.P.M.
3500 R.P.M. 5000 R.P.M.

$32.50

If you've seen SKILDRILL or heard about the thousands of SKILDRILLS in war plants, you know it's perfect for easy, top-speed, day-long drilling. And now you should know that SKILDRILL has been improved . . . with new special features that put it even farther ahead of every other ¼-in. drill in the market!

We improved the gearing . . . made SKILDRILL run quieter than ever without adding an ounce to its easy-handling 2¾ lbs.!

We stepped up the cooling system . . . made this *cool* drill run COOLER without making it bigger (only 2⅛ in. wide and 6⅝ in. long). And we offer SKILDRILL in 4 SPEEDS to give you peak performance on whatever material you use . . . to speed up every production drilling job in your plant. Ask your distributor to demonstrate new, *improved* SKILDRILL today!

SKILSAW, INC., 5027 Elston Ave., Chicago

New York • Boston • Buffalo • Philadelphia • Cleveland • Detroit
Indianapolis • St. Louis • Kansas City • Atlanta • New Orleans
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SKILSAW PORTABLE ELECTRIC TOOLS

★ MAKE AMERICA'S HANDS MORE PRODUCTIVE ★

HERE'S A NEW WAY TO SELL FILTERS

Uncle Sam demands that your customers cut down fuel consumption . . . and here's the easiest way for you to help them comply . . . by selling them a box of RESEARCH AIR FILTERS. Saves fuel for them, increases profits for you!

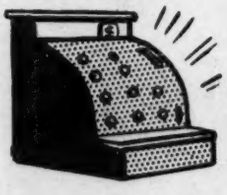
IT PAYS TO

SELL·A·BOX

OF AIR FILTERS

SELL 6 FILTERS, an entire box, enough for at least a year's service (filters should be changed twice a year, at least)

IMPROVES HEATING . . . because your customers will change their filters more often . . . and thus eliminate troubles.



SAVES TIRES . . . only one delivery trip instead of two or three because you Sell-A-Box.

INCREASES PROFITS . . . because you double and triple air filter profits with a single sale.

RESEARCH AIR FILTERS

"100 SERIES" disposable filter . . . bound by fiber frame . . . high cleaning efficiency.

"200 SERIES" exclusive re-fillable filter, uses no critical materials

Write for full details.

RESEARCH PRODUCTS CORP., MADISON, WIS.

HERE'S THE SPOT
to get YOUR
FURNACE REPAIR PARTS

Need repair parts in a hurry? Then order them from Northwestern . . . for Northwestern has a complete stock on hand and can supply parts for all makes of furnaces IMMEDIATELY.

When you order from Northwestern you speed up repairs, for there is no waiting for parts . . . and every part fits perfectly and can be installed in minimum time. Northwestern parts are built to last . . . to give your customers years of trouble-free service.

Send for complete catalogue NOW.

NORTHWESTERN
STOVE REPAIR CO.
662 W. Roosevelt Road, Chicago, Ill.

Circulating Heaters Can't Provide Comfort

(*Continued from page* 52)

omitted if an uncased furnace be installed in a tight heater room the walls of which serve as the casing. Note that even above the furnace—and on gravity operation—temperatures of the walls were "only moderately warm" at high firing.)

Short tests were made during which the flow of oil to the heater was controlled manually by use of the needle valve rather than automatically by the thermostat. Proper control of temperatures within the house by manual control seemed to be quite possible. During these tests the heater was operated for a period at low fire in order to check the minimum B.T.U. output, which is often as important as the maximum. The minimum B.T.U. output per hour was found to be 5600. The maximum output as rated by the manufacturer was 66,000 B.T.U. per hour.

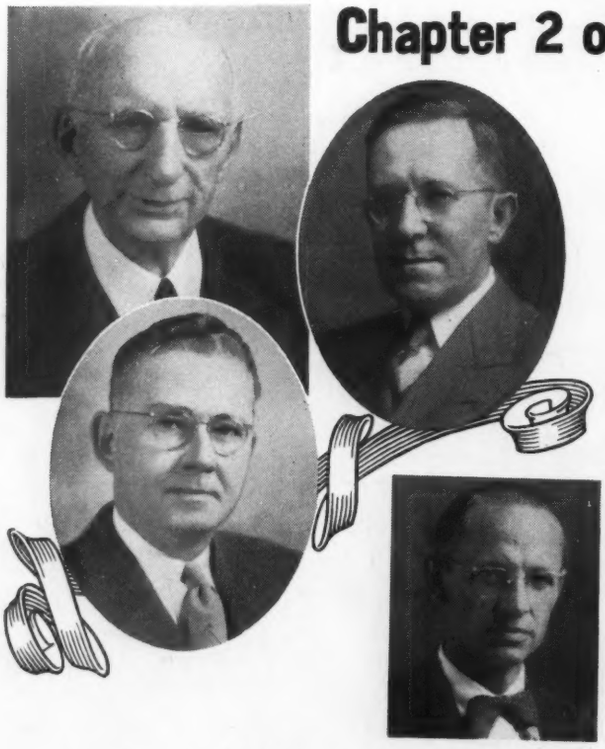
A surprising uniformity of temperatures from room to room existed during the tests, even during the periods when both return grilles and supply registers were removed from their openings. Attempts were made to eliminate the minor differences in house temperatures by adjusting the louvers in the supply registers, but such attempts were not successful because even with the louvers wide open the registers offered too much resistance to the flow of air. In one test, two fans rather than one were placed behind the supply register in the living room, since this was the largest room. During this test the uniformity of house temperatures was improved.

During the general tests of this study the fans operated continuously. Various heating cycles were tried for short periods. In one test the fans were operated by switches, being turned on when the thermostat called for heat and turned off when the thermostat was satisfied. It was found that the fans were in operation an average of 7 minutes during cycles of 15-minute length and that the constancy of the temperatures was not satisfactory. In another test the fans were put into operation only after the thermostat called for heat and the temperature within the duct had reached a predetermined maximum temperature. The fans then operated until the temperature within the duct reached a predetermined low level. This operating cycle, while productive of better heating than the former cycle, was not altogether desirable. It was concluded that maximum comfort and heating efficiency would result if the fans operated continuously.

Revised Heating Installation

Following the February testing period, the heating installation was revised as a result of previous findings. (See Plate 4.) The enameled jacket of the heater was removed, and the heater shell was mounted upon supports and placed within a built-in, black iron shield. Removal of the jacket decreased resistance to air flow over the

Chapter 2 of "Handy Pipe Personalities"



"In the left corner" is Mr. Geo. Harms himself—probably the best-known active furnace-pipe and sheet-metal man in the United States today. Notice that we say "active"—for Mr. Harms is now 82—he IS active—and on the job every day as he has always been during the 55 years he has helped Handy Pipe grow from a mere idea to its nation-wide use today.

To his right is Mr. Carl Roth—Supt. of the Handy Pipe plant and in charge of production. It was a simple job for Carl until the war "took charge" and since then Carl has met and mastered problems he'd never dreamed of before '41. He's now in his 36th year with Handy Pipe.

Below—Mr. Erwin Eichenberger who is Assistant to the Manager and who has taken much of the load off Mr. Harms' shoulders out in the field and in contacting the gratifyingly large number of Handy Pipe users built up through the years. Erwin is now in his 21st year with us.

To the lower right is Mr. Wm. J. Bruninga—a grandson of the founder who is now in his third year in our sales department.

Altho the sale of furnace pipe is restricted, repair and maintenance of heating plants is permitted. If you have such work write us your needs—we MAY be able to serve you.

F. MEYER & BRO. CO., Peoria, Ill.

Niagara Foot Gap Shears with 18-inch gap make it possible to shear sheets that are longer than the cutting length of the shear, by making successive strokes. Sheets within the cutting length of the shear may be passed through from front to back and sheared as in standard squaring shears.

Easy foot operation is the result of Niagara engineering. Every working part is designed to save effort both in operating the shear and in handling the material.

Self-locking steel holddown is operated by eccentrics manually controlled and exerts heavy pressure on the metal to be cut, thus assuring accuracy. The holddown is so designed that the cutting edge is visible for locating sheets for shearing to a line. The eccentrics are self-locking, thus enabling operator to let go of the holddown operating mechanism while he operates the treadle.

Tubular treadle mechanism has a large tubular cross-shaft to eliminate twist and to assure equal motion of both ends of the cross-head, regardless of the location of the operator's foot on the treadle. The treadle extends clear across the front of the machine.

Niagara Foot Gap Shears are built in 36 to 72 inch lengths for 16 gage capacity.

Write for Bulletin 80-D. Niagara Machine & Tools Works, 637-697 Northland Ave., Buffalo, N. Y. District Offices: Cleveland, Detroit, New York.

heating surfaces. The black iron shield served to guide the flow of air, to give some control of air velocity across the heating surfaces, and at the same time to protect the walls of the heater chamber from radiant heat and consequent charring. Underneath the heater was placed a centrifugal blower with a capacity of 1,200 cubic feet a minute. This blower was designed to run at a slow speed of 400 revolutions per minute, and as an additional precaution for control of noise, cushion damper mountings were specified. The outlet velocity of the blower was 700 feet per minute. Larger return grilles were installed. A removable panel was built in the ceiling of the heating chamber in order that the blower might be used for ventilation during the summer months.

The revised heating installation was given a preliminary inspection on April 5, 1939. On April 6, the heater was fired at 9:30 a. m. and limited tests were made until 2 p. m. During this test period the outside temperature rose from 42.0° to 45.5°, with an average of approximately 43.0°. Although some heating was done within the house the preceding day, the house had remained cold overnight and consequently did not reach an equilibrium with respect to heat loss even by the end of this test.

The heater was thermostatically controlled and the blower operated continuously. Although the blower appeared to increase combustion within the heater only very slightly, it was considered advisable to install a small baffle between the blower outlet and the bottom of the heater shell. With the addition of this baffle, the combustion within the heater was the same as that observed during the previous tests with the small fans.

Measurements of the quantities of warm air delivered to the rooms, made by the use of a vane anemometer, showed that the blower delivered approximately 1,200 cubic feet a minute. Air was supplied to the rooms at a temperature of 79.5° when the heater was operating at low fire and at a temperature of 84.0° when it was operating at high fire. The temperature of the return air was approximately 70°.

During the testing period, the average temperature 6 inches above the floor was 67.7°; 40 inches above the floor, 72.0°; and 6 inches below the ceiling, 75.6°. The difference in the stratum temperatures would no doubt been less had the house been previously heated and at equilibrium. Relative humidity was approximately 40, and air movement across floors was approximately 20 feet per minute. Consumption of oil during the period was only 1¼ gallons.

From the above data it was concluded that this heating installation was efficient and compared favorably with other types of heating formerly tested by the Authority.

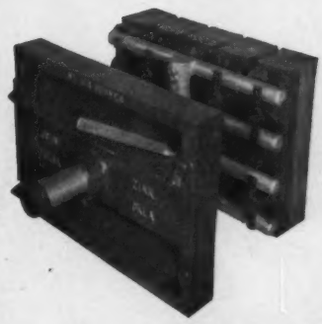
Commercial Equipment

Following tests with revised heating installation, which showed that the type of heating studied was basically sound, a specification was

They've Got to be Good!...

THEY'RE

John Zink
CONVERSION BURNERS



SERIES "R" BURNER

Refractory type gas burner — ideal for installing in boilers with very low draft and small combustion space.

ADVANTAGES:

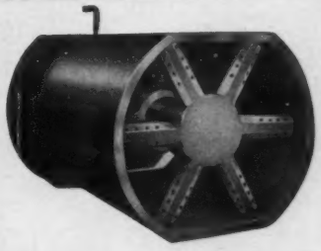
High heat transfer, higher ratings, no vibration, less draft loss.

No. 300 FURNACE BURNER

Shown with automatic controls—luminous gas flame type. Applicable to 98% of all domestic furnaces.

ADVANTAGES:

Low price, durable, easy to operate, no maintenance costs.



ZINK STAR BURNER

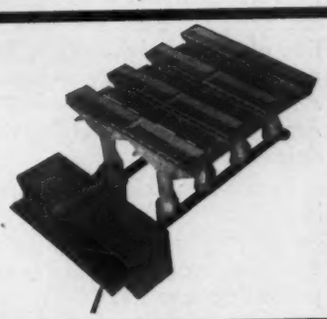
Low pressure, radiating armed spider gas burner, applicable to heating or power boilers. Walled type.

ADVANTAGES:

Turns up without vibrating, turns down without "blowing out." Economical and simple.

SERIES "V" BURNER

Pre-Mix floor type. Ideal for heating plants, cantonments, churches, schools, apartments.



ADVANTAGES:

Absolutely noiseless, sizes for every boiler, easy-to-install, high capacity and efficiency, LOW COST.

Write for Details Now!

John Zink Co.

TULSA, OKLA. NEW YORK

LOS ANGELES ATLANTA

written for a factory assembled unit and submitted, with drawing, to a representative group of manufacturers. It seems evident that the capital cost of a factory assembled unit would be lower than TVA assemblage of a unit such as the one installed in the Gilbertville Type AA house. The Authority also wished to benefit from constructive suggestions that manufacturers might offer and to inspect any sample heaters built to these specifications. The first furnace built and offered for test had these characteristics:

Burner: Pot type; Oil consumption: .65 gal. per hr.; Efficiency: 75%; Net heat output: 65,000 Btu per hr.; Uncased heater measurements: 23 by 23 by 68 inches; Air delivery: 1,000 cfm at 1/8 inch SP; Motor: 1/6 HP; Shipping weight: 340 pounds.

(*Editor's note: This furnace, probably the first PBA-18, was tested outside the heating chamber in 70-degree outside weather and, so, showed only that the basic idea of a furnace of this type was sound, but gave no indication of what the system could do in winter weather.*)

•

Galvanized Iron Wall Stack and Pipe

Manual Frank of the Frank Coal Company, 816 Tenth Avenue North, Nashville, Tennessee, has approximately the following inventory of wall stack to dispose of:

1800 ft. 3¼x14 galvanized iron will stack 2½ ft. length
1200 ft. 3¼x12 galvanized iron wall stack 2½ ft. length
800 ft. 3½x8 galvanized iron wall stack 2½ ft. length
2000 ft. 6 in. galvanized pipe

Comfortization

TO STEP UP PERFORMANCE WHEREVER PHYSICAL LIMITS ARE STRAINED!

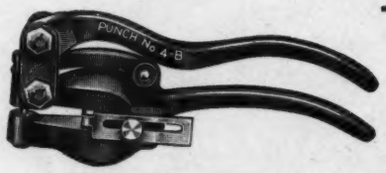
IN THE AIR, in the factory, in the home—wherever the Fight for Freedom imposes new and greater limits on human performance—there PACIFIC-AIRMAX heating and conditioning equipment does its vital, timely job of increasing human efficiency through greater comfort.

PACIFIC-AIRMAX CORPORATION—formed through the merger of AIRMAX CORPORATION of San Diego, California, with PACIFIC GAS RADIATOR COMPANY of Huntington Park, California—now combines in one fully staffed and equipped plant complete facilities for the production of special high-altitude heating and comfortizing equipment for aircraft and a complete line of PACIFIC-AIRMAX gas heating and ventilating equipment for America's factories, training stations, cantonments and defense homes.

PACIFIC-AIRMAX engineers are developing and applying advanced design principles to wartime heating equipment that will be reflected in a new, still better and more saleable line of PACIFIC-AIRMAX equipment for peace-time uses after Victory is won.

Pacific PRC Airmax
CORPORATION
HUNTINGTON PARK, CALIFORNIA

WHITNEY
LEVER PUNCHES



NUMBER FOUR "B" PUNCH

This punch for sheet metal work has a capacity of ¼" through 16 gauge. Weight 3 lb. Length 8½". Depth of throat 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key. A time-saver for your up-to-date shop.

And here's another handy tool for the modern shop — the No. 2 Punch. Length 23". Capacity 5/16" through ¼" iron, weight 12 lbs., depth of throat 1-11/16". Punches and dies 3/32" to ½" by 1/64".

NUMBER TWO PUNCH

W.A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

Kruckman — New Furnace Regulation

(*Continued from page* 23)

No one yet knows what will be done with trade-marks and trade-names. In theory, the firms compelled to pass out may either receive a subsidy from the Government or some of the profits made by those who are permitted to take over the business. Hector Lazo, head of the greatest merchandising association in the United States, now member of the Board of Economic Warfare, calculates the subsidies, if put in over-all operation, including OPA-price-fixing subsidies, will cost every living human being in the United States, regardless of age, color, station, or nationality, somewhere around $70 per year.

The concentration plan, like almost all other plans we use in the War, came from Britain.

British Concentration Schemes

Five methods of "concentration" had been employed in Britain. There was the Merger, which meant permanent concentration of production and ownership of firms in an industry; there was Levy and Compensation, in which the "nucleus" firm or firms take the entire business of an industry and pay a fixed amount to the others; there is also the Transfer of Quotas, in which the nucleus firms buy out the rights of other firms to produce certain quotas of goods; and there is Pooling, in which all firms of an industry share in the profits of the firms, which are permitted to operate; and finally there is the Agency Agreement, under which the nucleus firms produce the articles as

UNCLE SAM
NEEDS YOUR
HEALTH
AMERICA'S GREATEST Inland RESORT
BATHE AND PLAY AT
HOT SPRINGS
NATIONAL PARK • ARKANSAS
OVERNIGHT
FROM MOST CITIES
Play your part in America's Victory Program by protecting and increasing your energy, vigor and health. Relax at this famous health spa, in the beautiful Ouachita Mountains. All sports and recreations; two beautiful lakes with more than three hundred thrilling miles of picturesque shoreline.
The Majestic provides unusually fine accommodations, from single rooms to 2, 3, and 4-room apartments for light housekeeping. Government supervised bathhouse in hotel.
C. EMMETT KARSTON, Manager
DAILY RATES FROM $1.50
EASTMAN
HOTEL AND BATHS
MAJESTIC
HOTEL • APARTMENTS • BATHS
The Eastman Hotel in the spaciousness of its own private park...offers excellent rooms conveniently close to everything. Government supervised bathhouse under same roof.
WALTER E. DAVIS, Manager
500 ROOMS FROM $2
Direction: SOUTHWEST HOTELS INC.—H. Grady Manning, Founder

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PLATTE OVERTON'S
"FORCED AIR HEATING"
215 Pages—6" x 9"—Illustrated—$1.00

Here is a book that will save you hours of time in the planning of your forced air heating jobs, as well as help you to avoid errors in your calculations. Outlined in it is a model procedure of design, based on wide experience, which you may follow with absolute confidence on any of your own jobs.

"Forced Air Heating" embodies all of the really worthwhile new data on forced air heating that has been developed through research and experience over the past several years. It illustrates by clear and concise examples the proper application of this new knowledge in actual designing work. Fifteen helpful charts, 23 time-saving formulas, and 19 practical tables are included with detailed explanation of their proper use.

Every contractor now doing or planning to get into forced air work should own a copy of this book. Send $1.00 today to the address below for your copy. You may order with the privilege of returning the book within 10 days for a refund if it should for any reason prove unsatisfactory.

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave. Chicago, Illinois

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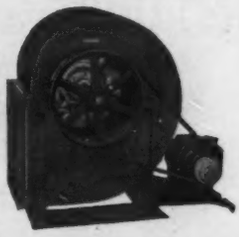
Schwitzer-Cummins Company



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HY-DUTY Blowers, 9¾" to 25".
Top and Bottom Horizontal, and Top and Bottom Vertical Discharge.
Top and Bottom Motor Mounting.
Dual Units also available.

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Double Inlet, Double Width.
Reinforced Center Disc.
Designed for Modern Air Conditioning and Heating Applications.
Sizes, 4½" to 50".

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For Oil Burner, Stoker, and Air Conditioning Applications.
Sizes, 4½" to 50".
Variety of Blade Lengths for each diameter.

● ENGINEERING DATA
Write for Catalogues showing complete Performance Data.
Experienced Engineering Department available to help solve your Air Handling Problems.

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SCHWITZER-CUMMINS COMPANY
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BOOST PRODUCTION SCHEDULES WITH

MARSHALLTOWN THROATLESS SHEARS

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CUT ANY SHAPE

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CUT ANY SIZE SHEET

No. 18 HAND POWER

Here's just the Shear that offers every feature you want. It does hundreds of odd shearing jobs better and faster—yet is an inexpensive hand operated tool. No matter what type of cutting—either irregular shapes or straight splitting—from ANY size sheet, you'll quickly find that the Marshalltown Throatless Shear is the most profitable tool in the shop.

Get Special Shear Bulletin today. Gives details of sizes from 18 gauge to one-half inch capacity.

MARSHALLTOWN MFG. COMPANY
920 E. Nevada St., Marshalltown, Iowa

the agents of the firms not permitted to manufacture; and the firms not permitted to produce buy the goods at cost and distribute them among themselves.

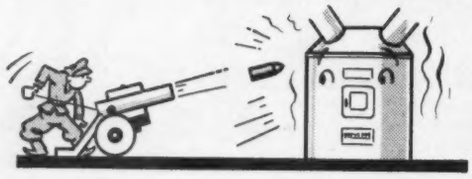
Apparently our people, over here, are much intrigued by the idea of Pooling, which they would like to combine with some part of plan designated as Agency Agreement. They have in mind that the selling organizations of the firms left without production facilities may continue, at least in part, as the selling organization of each separate firm, and thus preserve the identity and the individuality of each firm.

It has been suggested in your industry that this system might be adopted in order that each firm shut down could sell Victory models carrying their own name plates and some individual mark that would maintain the trade-mark and the trade-name of each separate firm. Obviously the eventual plan of operation depends substantially upon the type of plant permitted to continue. It is said competitive selling is permitted, but it is not made clear how competition is operated with price control, and with pooled sales distribution.

A British Government report states: "Concentration is compulsory for firms making up raw materials, subject to Government control. Nucleus firms take over the business and either merge with closed firms, sell goods at cost, or pay them a flat sum or share of the profits. *It is expected* that firms owning these closed plants will be revived after the War. Government has urged that trade-marks of the absorbed firms be kept alive, and skeleton sales forces be maintained. Advertising is encouraged."

The "concentration" of American industries is under the direction of a WPB Committee on Concentration of Production. It is headed by Joseph L. Weiner, Deputy Director of WPB Office of Civilian

REPUTATION GAINED UNDER FIRE!



There's only one way to get a good reputation. You have to get out and earn it. That's what Tharco Asbestos Furnace Cement did long ago—and has kept on ever since. Tharco won out by standing up to all that was expected of it—and for more than 30 years its ability to work has made it the standard of the industry. Tharco is something that works *with* you and *for* you. It does the job so it stays done and makes the furnace owner happy. So it's no wonder Tharco is now used by leading manufacturers of furnaces and by the leading repair men, too. Have *you* tried Tharco?

Ask for a free copy of our valuable folder!
"The Proper Use and Care of Furnace Cement"

AT LEADING JOBBERS

THARCO *Asbestos* **FURNACE CEMENT**

The Armstrong Company—Detroit • Dallas • Chicago

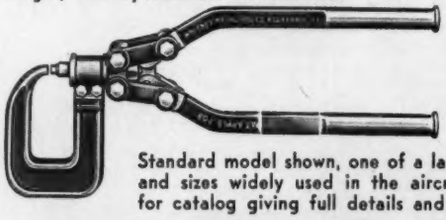
BUY WHITNEY-JENSEN
METAL-WORKING MACHINERY and HAND TOOLS
for LONG LIFE and ACCURACY

BENDING BRAKES

ROLLER BEARINGS GIVE EASIER, FASTER OPERATION

12, 14, 16 ga., 4-5-6-8-10 ft. sizes

Tests show these brakes to be much faster, and easier on the operator, than a plain bearing brake. Combination type for box and pan as well as all kinds of straight bending. Heat-treated jaws for stainless steel. Lightweight, durably accurate construction.



AIRCRAFT RIVET SQUEEZER

Standard model shown, one of a large variety of types and sizes widely used in the aircraft industry. Write for catalog giving full details and prices.

WHITNEY METAL TOOL COMPANY
91 FORBES STREET • ROCKFORD, ILLINOIS

Supply and head of the Industry Advisory Committees Branch. Other members are Lou Holland, head of the Smaller War Plants Corporation; and Wendell Lund, director of Labor Production Division of WPB. Amory Houghton, Director General of WPB, was the other member, but he has resigned from WPB. Each of the 23 industry branches of WPB, however, have virtually worked out the "concentration" programs for their specific industries.

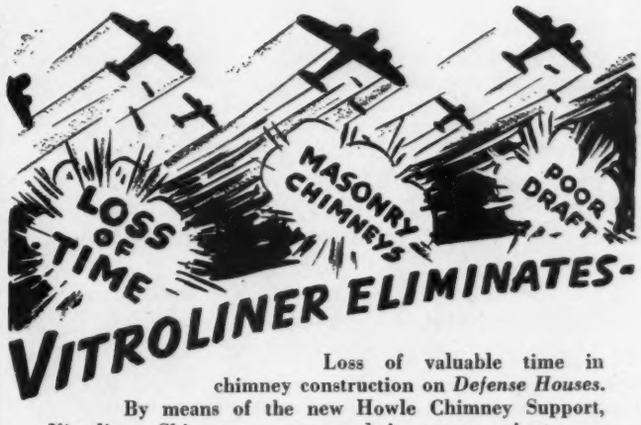
◆

Relief for PRP Applicants

(*Continued from page* 31)

PRP application as required and have not yet received their certificate. In order to obtain such material, they may apply or extend ratings on orders received by them, or may use ratings under any "P" order under which they have previously operated, even though the "P" order may have expired so far as other producers are concerned.

Class I producers who have submitted their PRP applications for the fourth quarter may also order for delivery in October up to 40 per cent of their indicated requirements, and for delivery in October and November up to 70 per cent of such requirements, prior to receiving their certificates. However, all material delivered under the interim procedure in either the third or fourth quarter must be deducted from the amounts authorized on the certificate when it is received, and such deliveries are subject to all other orders and restrictions issued by WPB.



VITROLINER ELIMINATES-

Loss of valuable time in chimney construction on *Defense Houses.*

By means of the new Howle Chimney Support, Vitroliner Chimneys are erected in twenty minutes or less.

Vitroliner Chimneys eliminate completely all masonry construction, along with cracks and poor draft. By our tests Vitroliner Chimneys give double the draft of a masonry chimney.

Thousands of Defense Houses are now using Vitroliner Chimneys. They are insulated with Fyrex prefabricated asbestos and are built of acid resisting vitreous enamel coated steel pipe.

Write for details to:

VITROLINER -the Superior Vent Pipe
Trade Mark Registered

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ATH-A-NOR

FURNACE REPAIR PARTS

COMBINE QUALITY EFFICIENCY

Ath-A-Nor Furnaces manufactured by the May-Fiebeger Company for the past 50 years have proved their ability as economical and efficient heating plants in thousands of homes throughout the country.

In these days of conservation, you should check all furnaces. Replace all parts that impair efficiency, and make certain that they operate perfectly. When ordering repair parts for Ath-A-Nor furnaces order them from May-Fiebeger. They will operate as efficiently as the original parts and assure longest wear. Remember . . . Ath-A-Nor Furnaces for the "MUST" replacements . . . and Ath-A-Nor Repair Parts for easiest installation and highest efficiency.

MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS

MAY-FIEBEGER COMPANY

NEWARK OHIO

Today's War-Time Industrial Market is Your BEST BET NOW

—LET CLARAGE EQUIPMENT HELP SELL THE JOBS!

New war plants — and plants being converted — need heating, ventilating, exhaust and blow pipe installations. This high priority business can be your salvation. Specify Clarage Fans, Blowers, Unit Heaters — Nationally known and Nationally accepted, these highest quality air handling products help you land the jobs. Write for any information desired.

UNIT HEATERS

EXHAUST FANS

VENTILATING FANS

COMPLETE AIR CONDITIONING • COOLING • VENTILATION • FACTORY HEATING • MECHANICAL DRAFT • FANS and BLOWERS for INDUSTRIAL NEEDS

CLARAGE FAN COMPANY - KALAMAZOO, MICH.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

Sheet Metal In Aircraft Building

(*Continued from page 65*)

temporary forming dies made of hardwood or steel-embossed. The use of the rubber pad into which to impress the die, with the pliable metal blank in-between becoming a stamping, will find a growing application.

The induced oxidization of the metal in a formed part has been perfected scientifically in the aircraft industry. The oxidization prevents ready corrosion. It also forms a bed for paint, the oxid being in reality an "eating into" the metal surface, with the paint filling in, sticking that much tighter to the metal. (Old-timers in roofing, for instance, practiced oxidization of the galvanized sheets roofing by delaying the painting of the roof until after the morning dew had induced the zinc-coating to assume a grayish dust covering, the painting then resulting in the paint sticking to the metal, not peeling off).

Heat-treament of metals worked has been practiced in the sheet metal trade since its inception. The coppersmith hammering out a kettle was a master at it. In deep drawing in the stamping industry we practice it. And its application to aluminum alloy sheets in aircraft building is simply a more scientifically elaborated application of the art, perfected after the early users of aluminum alloy sheets and extruded shapes in the automotive industry have had their try at it.

THESE ARE *Your Customers!*

YOU'LL SELL THEM FASTER WITH HESS QUALITY EQUIPMENT

Defense workers, bankers, salesmen—these are your customers—people who appreciate the precision craftsmanship of the HESS line of quality heating equipment. You'll profit by HESS' financing and territory plan.

DEALERS: *Write TODAY for New 1942 Portfolio!*

IN 1942 FEATURE—selling, modernizing, replacements and repairing with

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Quality Equipment from HESS Costs Less!

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KEEP 'EM FIRING with Gar Wood

★ Self-Contained Forced Warm Air Automatic Oil-Fired Heating Units. (from 50,000 to 500,000 B.T.U./Hr.)
★ Industrial Space Heaters up to 500,000 B.T.U./Hr.
★ Boiler-Burner Units up to 25 HP.

Some Distributors and Dealers are receiving Government business for Heating Equipment. If you are one of those who are called upon to submit estimates, heating plans and surveys, we suggest you enlist our cooperation and our engineering service.

Write today for "ENGINEERING STANDARDS"—this valuable 72-page book on Engineering, Installation and Operation of Heating Systems, sent free on request to Sheet Metal Contractors and Dealers, Engineers and Architects. This offer made for a limited time only. Address reply to Dept. 14

HEATING DIVISION
GAR WOOD INDUSTRIES, INC., DETROIT
Protect Freedom—Buy War Bonds

Libert Hi-Speed SHEAR

Makes INSIDE Cuts
without a starting hole!

A Libert SHEAR does a GREATER variety of work without machine changes . . . Shears inside circles, rings, plain or irregular shapes, trims formed pieces — in steel, brass, aluminum alloys, stainless steel, metal screen, and fibre. Maximum capacity 10 gauge mild steel.
This versatility plus greater speed, accuracy, and simplicity makes the Libert Hi-Speed Shear a valuable time and labor saver. Write for details.

LIBERT MACHINE COMPANY
GREEN BAY, WISCONSIN
Quality Shears Since 1915

Converting Oil to Coal

(*Continued from page* 41)

down for a serious talk will he take enough interest to ask questions and permit a survey to establish his particular needs. This must be done by the heating man.

So far in this over-all drive to convert the only industry which has been really active is the coal dealers. Some of the coal producers or distributors have brought out conversion grates; many coal dealers or groups sell control systems; the whole coal industry is offering inspection service and a large portion of the coal industry is getting ready to do the actual conversion. This should be the furnace man's job. But we won't get the work unless we get off our pants and actively solicitate, inspect and recommend.

◆

Tinsmith Aged 103

Ben Callahan of the Ben Callahan Tin Shop, 25 Kent St., Akron, Ohio, writes: "We are proud of the distinction of having with us James E. Rutherford as the oldest tinsmith, civil war veteran and citizen of Akron—probably the oldest tinsmith in the United States.

"Mr. Rutherford celebrated his 103rd birthday on June 18th last. He is a technician and inventor and for many years proprietor of a hardware business in Akron, but spent most of his time in the tin shop, carrying on well up in his eighty years. Mr. Rutherford was born in County Moville, Ireland and served two years with the 9th Massachusetts infantry. He lives at 207 Rhodes Avenue."

PERFORATED METALS

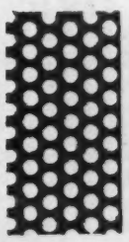
Every Sheet Metal Worker needs perforated metal in one form or another.

For processing food products and to withstand certain chemicals, perforated Stainless Steel and Monel Metal are much used.

Factory Safety Guards — For this service perforated metal has no equal.

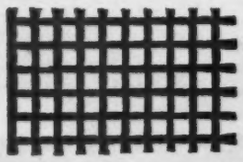
For Grilles, Radiator Enclosures, Air Conditioning Cabinets, we have many beautiful designs.

Write today for information and prices.



You'll like H&K prompt, satisfying work and pleasing prices.

Perforators of metals since 1883. Send us your specifications.



The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

FULL ACTIVE GRATE SURFACE
WITHOUT DEAD PLATES

MAINTAINS A LOW COMBUSTION RATE PER SQ. FT. OF AREA

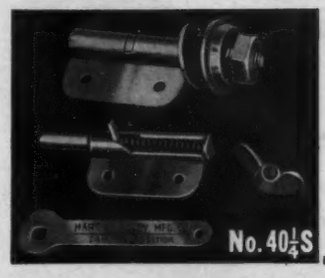
Frederick STOKERS

★ More grate area, but low combustion rate per square foot of area! . . . Frederick Stokers have specially designed tuyeres with air ports so arranged and proportioned as to insure correct air distribution and maximum efficiency in combustion. Enclosed wind-boxes with two clean-out doors, another exclusive Frederick feature, eliminate possible air leakage through brickwork. . . .

YES, NEW FREDERICK STOKERS ARE DIFFERENT. A long list of original features distinguish them; many common stoker problems are solved by them. We suggest you write for complete description. Just send a note on your letterhead to

The FREDERICK IRON & STEEL COMPANY
EAST STREET, FREDERICK, MD.
BUILDERS OF FINE STOKERS FOR OVER 24 YEARS
BUY WAR BONDS

H&C DAMPER REGULATOR SETS

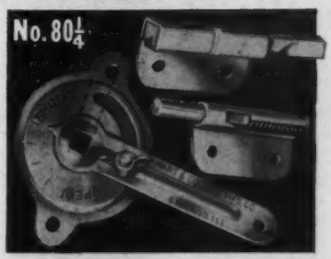


ECONOMY TYPE. Three ways to install: 1. With lock nut but without handle (for tamper-proof setting). 2. With handle and lock nut. 3. With handle and wing nut. Nut prevents damper vibration. Handle always indicates position of damper (Patent 2,146,142). Furnished with handy snap end bearing. Complete set in carton. Made only with ¼" bearings.

LIST PRICE.....No. 40¼S....$0.30

BRACKET TYPE. Nut holds damper securely, preventing vibration. Handle which indicates position of damper, may be left in place permanently or removed after adjustment (to prevent tampering). Snap End Bearing on ¼" size, Solid Bearing on ⅜" size. Each set individually packaged.

LIST PRICES.....No. 50¼.....$0.40
No. 50⅜ $0.60



DISK TYPE. Like all H&C sets, this set is equally adaptable to splitter or regular dampers. Snap End Bearing on ¼" size, Solid Bearing on ⅜" size. All parts are rust proofed. Complete set in carton.

LIST PRICES.....No. 80¼.....$0.40
No. 80⅜ $0.60

See your jobber or write for literature and sample.

HART & COOLEY MANUFACTURING CO.
HOLLAND, MICH. · PHILADELPHIA OFFICE: 1600 ARCH ST.

THERMO-DRIP HUMIDIFIERS

They're heat controlled! That's your greatest assurance that the heat produced by your customers' furnaces will be properly tempered with moisture—and what a vast difference that will make in building goodwill and sales for you.

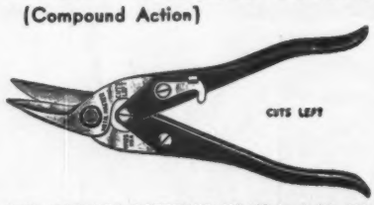
AUTOMATIC HUMIDIFIER CO.
18th and Main Streets **CEDAR FALLS, IOWA**

Send Us News of YOUR War Activities!

For the duration, the columns of the "War Time Trade News" Section will be devoted to news of the industry's personnel and organization war efforts and activities.

If some of your personnel join the armed forces, or various government agencies, let us know . . . in fact, anything pertaining to the industry's war achievement is news—send it in. The purpose of this section is to let the industry know, insofar as such news is permitted, what the companies are doing in war production . . . and where the many familiar faces that are missing have gone. Help us keep the trade informed. Send in your news NOW!

WISS "METAL-MASTER" SNIPS
(Compound Action)



"TWICE THE WORK WITH HALF THE EFFORT"

TWO MATCHED PATTERNS M1 (Cuts Left) M2 (Cuts Right) Cut circles, squares and any irregular patterns on Stainless, Dural and Monel Metals with the greatest of ease. Jaws of wear-resisting Manganese Molybdenum Steel. Handles hot-pressed from tough Chrome Vanadium Steel. Nickel steel bolts and nuts to Government specifications. All parts interchangeable. Detachable rubber handle grips at slight extra cost.

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ESTABLISHED 1848 NEWARK, N. J.

SPOT WELD
WITH AN
ACME "Hot Spot" WELDER

Proven utility for over 26 years in thousands of sheet metal fabricating plants.

Write for Literature and Prices.

Complete Range of Sizes

Lifetime Guarantee!

ACME ELECTRIC WELDER CO.
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DENSEWOOD Mallets
- - last Three Times as Long - -

Patented process shrinks wood to a superior substance, extra strong.

These mallets do better work and last three times longer. Cause no static. Do not mar highly polished surfaces. Do not splinter. Cost more and worth it.

Nicely balanced tool with an amazing lock-wedged handle that can never come loose. All sizes and types.

DENSEWOOD CORPORATION
ELKHORN, WISCONSIN

Then it dawned on us

"My husband and I went to town for a show. We were caught in a terrific storm. Then it dawned on us to stay at a hotel overnight. It was a grand escape from traffic problems and a nice little vacation."

Mrs. Mary C. Brinker, Dormont, Pa.

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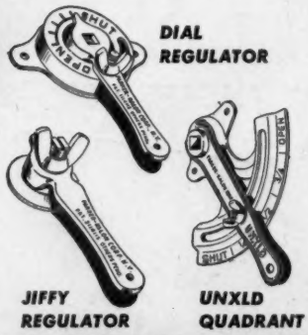
FOR A FRESH START
STOP AT A **HOTEL**

A Type And Size For Every Need

For efficiently controlling light and medium dampers in heating, ventilating and air conditioning systems, specify Parker-Kalon Damper Controls. The line includes all types and sizes, at a range of prices to fit the needs of any job. Parker-Kalon Corp., 190-192 Varick Street, New York.



DIAL REGULATOR

JIFFY REGULATOR

UNXLD QUADRANT

PARKER-KALON damper controls

THE QUALITY OF PAYNEHEAT EQUIPMENT IS STANDING USERS IN GOOD STEAD TODAY!

★ ★ ★

Priority Questions and Answers

(*Conitnued from page* 34)

to a prime contractor. A prime contractor *is in the category of a producer* and sales to him are governed by Schedule "A" and the other provisions relating to *producers.*

Q. Does Priorities Regulation No. 13 compel the sale of idle or excess stocks?

A. Priorities Regulation No. 13 is intended to encourage the sale of idle or excess stocks but *does not* compel their sale.

Q. What effect has Priorities Regulation No. 13 on materials purchased with priorities assistance?

A. A "Special Sale" of materials which were purchased with priorities assistance *can be made* in accordance with Priorities Regulation No. 13 *notwithstanding the provisions of Priorities Regulation No. 1* which prohibited the diversion of materials obtained with priorities assistance.

Q. Would a sale of materials acquired without benefit of priorities assistance be governed by Priorities Regulation No. 13?

A. Any "Special Sale" of *any* materials—*irrespective of how the materials were originally acquired* —come within the Regulation.

Q. What is the definition of the term "Producer" as used in Priorities Regulation No. 13?

A. A *"producer"* as used in Priorities Regulation No. 13 includes the ordinary manufacturer or fabricator and the various types of utilities mentioned in the Regulation. In general, a *"producer"* is considered as a person who buys materials either to use in his business or to convert into end products.

Q. Does "producer" as shown in Schedule "A" include building contractors?

A. Contractors are producers, thus "Special Sales" to such contractors are governed by the Regulation.

Q. Are repair parts for finished equipment covered by Priorities Regulation No. 13?

A. If a repair part is a *unit assembly,* it is to be considered as equipment and *not* covered by Priorities Regulation No. 13.

Q. Are sales of items like rivets, bolts, nuts, screws, etc., covered by Priorities Regulation No. 13?

A. Rivets, bolts, nuts, screws, nails, etc., are materials which can only be used when assembled with other materials, and, therefore, a sale by a person not in the regular business of selling such items *is* covered by Priorities Regulation No. 13.

Q. What is the course of action if it is desired to make a "Special Sale" of material which is not permitted by Priorities Regulation No. 13?

A. Use Form PD-470 or state the circumstances by letter giving a description of the material, the proposed disposition, the use to which it will be put, priorities rating, and other similar information. Make request to the Inventory and Requisitioning Branch, War Production Board, Washington, D. C., for authorization to make the proposed sale.

Whenever possible, however, the nearest field office of WPB should be contacted for help and advice in filling out Form PD-470.

POWERFUL SUCTION — MOTORLESS!

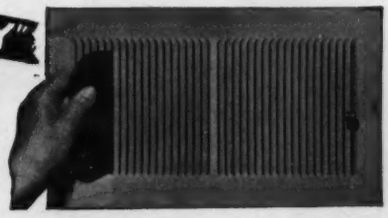
Serve the cause of Victory by conserving motors and motor power! Serve the cause of economy as well! ALLEN CONI-VANE TURBINE VENTILATORS do both.

With the trend in ventilation being away from motor power, Allen's famous Coni-Vane Turbine is the choice of all high-type installations. "Fresh Air is Free" with the Coni-Vane, for it uses no electrical current, yet supplies powerful suction.

Send for literature on all Allen self-operating ventilation equipment.

The ALLEN Corporation
9752 ERWIN AVE. DETROIT, MICHIGAN

"BEND-EZY"



REGISTERS
LOW COST
EFFICIENT
DURABLE

PERFECT FOR DEFENSE PROJECTS

STANDFORATED
PERFORATION OF ALL METALS

AIR CONTROL GRILLES
WRITE FOR CATALOG! Complete information on BEND-EZY Registers, STANDFORATED Grilles, Industrial, Ornamental Perforations, Stampings.

STANDARD STAMPING & PERFORATING CO.
3137 W. 49th PLACE CHICAGO, ILLINOIS

Swartwout-Dexter
HEAT VALVE

Boost your standing in the roof ventilating field with this dependable high quality Heat Valve — the first continuous type ventilator made. Economical air movement for industrial and commercial buildings. Easy and profitable to install.

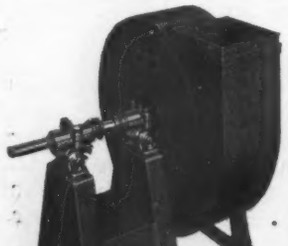
THE SWARTWOUT COMPANY
18511 Euclid Ave.
Cleveland, Ohio

BB
HOOKS AND HANGERS

THRU LEADING JOBBERS EVERYWHERE

BERGER BROTHERS CO.
Main Office & Factory
229-237 Arch St., Philadelphia, Pa.

★ ★



New and improved "EX" Fans are now available in standard sizes from No. 15 to No. 80 and from 200 to 30,000 CFM Capacity with pressures up to 15" W.G. These fans are commonly used for exhaust problems to handle dust, fumes, shavings, etc., but can be adapted for forced draft service.

"EX" Fans are furnished in all standard arrangements of the N.A.F.M. The design is such that it can be easily modified to suit special assemblies, thus "EX" Fans are ideal for resale purposes, as part of factory assembled units.

Std. Arr. No. 1 for Belt Drive

Write us about your problems. Send for Bulletin No. EX-41

BAYLEY BLOWER COMPANY
1817 South 66th Street Milwaukee, Wis.

BARBER BURNERS
For ALL Gas Appliances

S-80

Z-21

We supply Burner Units to hundreds of leading gas appliance manufacturers. We will design and furnish the proper size burner, with the proper jets, for YOUR appliance. BARBER Burners give complete combustion on natural, manufactured, bottled or Butane-Propane Gas.

Latest Catalog on request.

THE BARBER GAS BURNER CO.
3704 Superior Ave., Cleveland, Ohio

TRY US FOR QUICK DELIVERY

Sheet Metal Fabricating

MACHINES & TOOLS

Write for Catalog and New Bulletin No. 53

WARD MACHINERY CO.
564 W. Washington Boulevard
Chicago, Illinois

REPAIR PARTS FOR ALL MAKES STILL AVAILABLE

With priorities restricting sales of new equipment, repair business is more essential than ever. PEERLESS dealers can still depend upon prompt deliveries of repair parts for ALL MAKES AND AGES of furnaces. Get the repair business now and you'll be all set to get the new jobs after the war. PEERLESS builds warm air heating equipment in all sizes, including heavy duty units for the largest buildings. Write for dealer proposition and repair parts catalog.

PEERLESS FOUNDRY CO., 1853 Ludlow Ave., INDIANAPOLIS

Tampico
CHICAGO FILTER CO.
JOLIET, ILL.
FILTERS

Bremil

PORTABLE SHEARS

Your work will proceed faster and neater when you use Bremil Portable Shears on the job or in the shop. Write today for literature showing complete line.

ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be obtained for shearing stainless steel.

BREMIL MFG. CO., ERIE, PA.

Wholesalers' Profit Problems

(*Continued from page 74*)

market than it is on getting more business out of a territory.

Give Each Salesman a Volume Quota

After required volume has been provided for, the next step in the volume control plan is to divide that volume into well weighted portions. These can be reasonably assumed as responsibilities for individual salesmen in order to ascertain how many salesmen will be required to assure that volume. Each sales quota then becomes a must performance, and failure to accomplish it would make the elimination of the salesman automatic. Salesmen are too often carried despite inadequate performances. By carrying nonproducers, operators simply waste their share of the potential. Family ties and politics have no place in business. Yet, they are the most frequently encountered obstacles in the way of success.

Volume means not only unit volume or dollar sales volume, but most important of all, it means income dollar volume, or gross profit income. A salesman, therefore, cannot be rated as a producer unless he is bringing in his quota of income (gross profit) regardless of any other virtue of his performance. Many salesmen have produced high sales dollar volume for wholesale companies and have been low income gross profit dollar producers. Quotas and compensation should be based entirely upon this one and only important factor.

Drastic Changes May Be Necessary

Finally, keep this in mind. If any business is so organized that the six basic factors—investment, gross profit, fixed operating cost, variable operating cost, volume and profit are each the definite responsibility of capable individuals, and these individuals successfully execute their duties in assuming those responsibilities, profits will be assured.

The wholesale business must be organized for efficiency, and efficiency can only be measured in terms of the organization's ability to earn a reasonable profit. Remember this, the problem now faced by the wholesale business is not one of ascertaining how much profit may result under existing organization, but rather one of determining what organization is necessary to insure a desired profit. Drastic revisions in the wholesale structure are indicated. Successful operators must have the courage to face these essential issues!

CHICAGO STEEL BRAKE

BEST BY FORTY-TWO YEARS TEST

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

Elgo Ventilating Specialties

Non-Rattle Automatic Shutter

Here's an automatic shutter that's absolutely quiet. Its patented spring mechanism holds the louvres so tightly closed when not in use that there is never any flapping or fluttering. Yet the louvres open wide the instant the fan or blower starts.

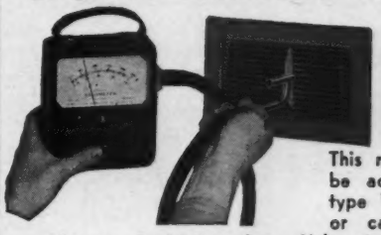
Write for catalog and prices.

"ELGO" TYPE AUTOMATIC SHUTTER Rear View (Closed)

Free CATALOG

ELGO SHUTTER & MANUFACTURING CO.
6966 W. Jefferson Detroit, Mich.

NOW! ACCURATE AIR VELOCITY MEASUREMENTS at INTAKE GRILLES!



This new jet attachment can be added to existing Tube-type Velometers now in use, or can be purchased with other standard jets and new Velometers.
The new intake grille jet is offered only in the spot type since the center reading only has proven to be sufficiently accurate for all commercial purposes. Write for information.

Illinois Testing Laboratories Inc.
412 N. La Salle St., Chicago, Ill.

HIGH EFFICIENCY...
LOW POWER COSTS

LARGE, STREAMLINED INLET MEANS MINIMUM LOSSES DUE TO ENTRANCE FRICTION OR EDDIES

WITH THIS
Sturtevant
MILL EXHAUSTER

B. F. STURTEVANT COMPANY
Hyde Park, Boston, Mass.
Branches in Principal Cities

"Designed and Built by the Pioneer"

★War Time Trade News★

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FURNACES

AND

FORCED WARM AIR HEATING EQUIPMENT for REPLACEMENT . . . for DEFENSE HOUSING

A dependable line of Gravity and Forced Warm Air Furnaces to carry you through the duration.

THE FOREST CITY FOUNDRIES COMPANY
2500 W. 27th Street Cleveland, Ohio

MERCOID

THE ONLY 100% MERCURY SWITCH EQUIPPED CONTROL LINE

Hermetically sealed corrosion-proof Mercoid switches are approved by time and experience. They assure better performance and longer control life.

THE MERCOID CORPORATION
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Syncromatic
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COAL OIL

AND

GRAVITY FORCED AIR

STEEL FURNACES

3373 No. Holton St., Milwaukee, Wis.

ECON-O-COL

the "Stronghearted"

STOKER

ECON-O-COL Automatic COAL BURNER

ECON-O-COL STOKER DIVISION
COTTA TRANSMISSION CORP.
ROCKFORD ILLINOIS

THE SHIELD OF QUALITY

U. S. Air Conditioning Corporation, Minneapolis, is making blowers for the navy, blowers and heaters for miscellaneous army camps, air bases, ordnance plants, and special confidential items for army air corps, navy ordnance and army ordnance. About 95 per cent of their present output is between these divisions. The payroll deduction plan has been in effect since May, 1940, with ten per cent or more deducted for war bands from great majority of office and factory employees.

L. S. Pawkett, San Antonio factory representative for the past six years is now a first lieutenant in the Army Air Corps.

Condensation Engineering Corporation, 2515 Archer Ave., Chicago, is furnishing Vitroliner complete chimneys for approximately 10,000 FPHA defense houses. Contracts are with the prefabricators and erectors who contract directly with the government. Approximately 95 per cent of their present business is in war housing.

More than 2,600 General Electric men entered the armed forces of the United States in May and June, bringing the company-wide total to 7,653 in the fighting forces at the end of June, W. W. Trench, secretary, announces.

This brings the percentage of male employees of the Company now in the armed forces up to 7.4, with the men enlisting or being called to service at the rate of almost 300 a week.

Of the total, 4,120 were called into service under the Selective Service Act, 1,222 entered by reason of membership in the National Guard or Organized Reserves, and 2,311 enlisted in the Army, Navy, and Marines.

Of the 1,222 in the National Guard or Reserves, 300 were in the National Guard, 623 in the Organized Reserves, 281 in the Navy Reserves, and 18 in the Marine Reserves. Among the enlisted men, 1,174 volunteered for the Army, 875 for the Navy, and 262 for the Marines.

May Oil Burner Corporation, Baltimore, reports that they are 100 per cent occupied with contracts with army ordnance and navy.

Ninety per cent of their employees are purchasing war bonds on payroll allotment plan.

Edward E. Yaggy, Jr., President of May Oil Burner is now a captain in the U. S. Army Air Corps.

George I. Chinn, chief engineer is now a 1st Lieutenant in the Ordnance Department, U. S. Army.

Owens-Corning Fiberglas Corporation, Toledo, Ohio, reports 30 former employees are in service as of July 31, 1942. The company produces thermal and acoustal insulation, air filters, electrical insulation, all glass service fabrics. More than 91 per cent of current production is being supplied under army, navy and maritime commission specifications. Employees are participating in a payroll deduction plan for the purchase of war bonds.

Henry M. Stillman, vice president, of **Synchromatic Air Conditioning Corporation,** Milwaukee, is now a Senior Lieutenant in the U. S. Navy.

The newly merged Pacific-Aimax Corporation of Huntington Park, California, is now engaged entirely in war work.

The merger was effected primarily to facilitate and extent participation of both of the merging organizations in the way of war effort, according to Mrs. Helen Hartfield, chairman and president of the corporation.

Walker Manufacturing & Sales Corporation, St. Joseph, Missouri, of which R. A. Walker is president, has had several jobs of a few hundred dollars each. One $25,000 contract for stowage boxes for the navy has been finished and the last shipment made.

About 92 per cent of their production is for the Defense program.

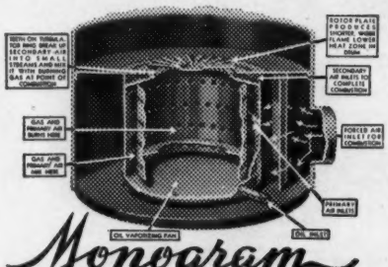
The company expects to have 100 per cent war bond purchases by their employees.

Famous Patented MONOGRAM Vaporizing Burner Provides Highest Known Operating Efficiency with Oil

Full Forced Winter Air Conditioners

◆

Booster Gravity Units



Utility Room Units

◆

Automatic Water Heaters

Monogram

The QUINCY STOVE MFG. COMPANY, Quincy, Illinois

★War Time Trade News★

United States Register Company, Battle Creek, Michigan, reports a new addition with complete new assembly and shipping departments. All employees are subscribing ten per cent for war bonds. Many of their men are in service.

Approximately seventy-five to eighty per cent of their present business consists of war orders.

N. J. Clarke, vice president of Republic Steel Corporation, Cleveland, and Everett D. Graff, president of Joseph T. Ryerson & Son, Inc., Chicago, are members of the board of the Steel Recovery Corporation, recently organized with headquarters in Pittsburgh.

Gilbert & Barker Mfg. Co., West Springfield, Mass., has won the Army-Navy "E" award.

Presentation of the award was made by Brig. Gen. W. P. Boatwright, Ordnance Department, U. S. A., to Stanley C. Hope, president and general manager of Gilbert & Barker.

James Dunn, chairman of the Gilbarco Employees' Conference, received the "E" lapel insignia in behalf of the employees.

Converted from the peacetime manufacture of oil pumps and burners, Gilbert & Barker is now turning out fire control, gasoline dispensary, lubricant dispensing and heating equipment, artillery and small arms material, ammunition components, aircraft parts and machine tool castings.

Joseph T. Ryerson & Son, Inc., Chicago, have a total of 270 employees in the armed forces from all ten Ryerson plants.

A. Y. Sawyer, assistant to the president, is now with Warehouse Unit, WPB, Washington.

W. F. Kurfess, vice president, is now Lieutenant Commander, Office of Procurement and Materials, Navy Department, Washington.

A. R. Winner, Manager Work Order Department, Philadelphia, is now 1st Lieutenant, Naval Reserve, Engineer Corps, Washington.

W. H. Walker, Manager Reinforcing Steel Sales, Milwaukee, is now Lieutenant (Senior grade) Civil Engineering Corps, 1st Naval District.

The present business of Ryerson is 100 per cent war orders.

Fred S. Doran, formerly Cleveland plant manager, has been elected Vice President, and transferred to Chicago, in charge of procurement for all plants—taking over the duties of W. F. Kurfess.

H. B. Ressler, vice president and manager of the Jersey City plant, is now spending a substantial portion of his time at the Chicago plant, in charge of sales for all territories.

More than 90 per cent of Ryerson employees are purchasing war bonds. The Buffalo plant was first to attain the goal of 100 per cent employee participation, subscribing 10 per cent or more of wages.

Ensign John M. Howard, Work Order Department, Philadelphia, was the first casualty. He met his death in England, while serving as Naval Observer in connection with mine and bomb warfare.

Ensign Linas H. Brown, formerly engineer, Chicago, was aboard the aircraft carrier Lexington, and saw action in Coral Sea.

Ensign Henry P. Rollick, formerly engineer in the Industrial Engineering Department, Chicago, was on submarine duty in the Philippines when war was declared.

Commercial Shearing & Stamping Co., Youngstown, Ohio, has been awarded the Army and Navy "E."

R. E. Near of the Willis Steel Corporation, Galesburg, Illinois, reports that all employees are on the payroll deduction plan in buying war bonds. The company has purchased a number of series G.

The company is manufacturing fire doors for supply depots and ordnance plants all over the United States. Ninety per cent of present business consists of war orders.

E. T. Johnson, with Wheeling Corrugating Company for the past twelve years is the new manager of the sales department.

Lawrence D. Duncan of the sales department is now in the air corps stationed at Orlando, Florida.

ROCK ISLAND
REGISTERS and INTAKES

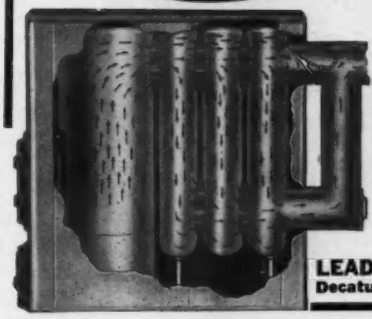
Two trade marks to remember when you want the height of efficiency, beauty and low cost combined in registers and intakes.

AIR-VANE NO STREAK

Dealers Net Estimating book, a time and money saver, sent free upon request.

ROCK ISLAND REGISTER CO.
ROCK ISLAND ILLINOIS

Leader KOOLSTACK FURNACES FOR STOKERS
OIL or HANDFIRED
50,000 to 200,000 BTU's
Patented Damper Uses All the Heat in the Added Heating Surface
THAT IS SOMETHING TO SELL



LEADER IRON WORKS, Inc.
Decatur Illinois

RUGGED CONSTRUCTION
SIMPLE OPERATION

MASTER
HEAT REGULATOR

TYPE A-23 Positive snap action—operates quietly, surely and safely.

WHITE MFG. CO.
2368 University Ave., St. Paul, Minn.

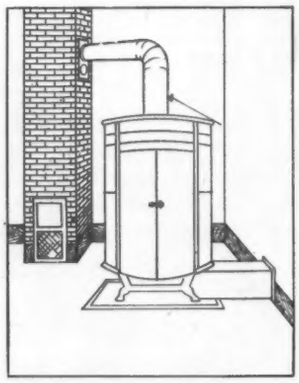
CHOOSE:
BONDS or BONDAGE
Buy U. S. War Bonds

With manufacturing facilities converted 100% to War Production, our research department is devoted to designing improved units to be added after V day to the complete CONCO line.

CONCO CORPORATION
Div. of H. D. Conkey & Co.
MENDOTA, ILLINOIS

GILCO
Automatic
FURNACES and WATER HEATERS

J. L. GILLEN CO.
DOWAGIAC • • MICH.



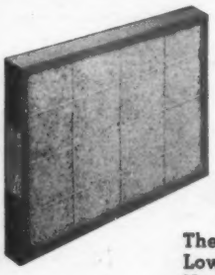
SCHOOL HEATERS

are on the Preferred List

Write for Particulars

Don't Forget SUN Fuel-Master Oil Furnaces after Berlin & Tokio!

J. V. PATTEN CO., INC., Sycamore, Ill.



AXIOM AIR FILTER

The result of fifteen years experience
Lower in cost — Higher in quality
Huge dust capacity—low resistance
Prompt delivery assured
Order now

BLOCKSOM & COMPANY, MICHIGAN CITY, INDIANA

Write for Catalog and Prices

Speed Up "AIA" Orders with a

BEVERLY SHEAR

Throatless shears that cut any shape . . . straight, round or irregular. FASTER—no distortion! Precision—accuracy! Order No. 1 for 14 gauge. No. 2 for 10 gauge. No. 3 for 3/16 inch mild steel and 10 gauge stainless.

BEVERLY SHEAR CO.
3009 W. 110th Pl., Dept. 1
CHICAGO, ILL.

Repair Parts FOR ALL HEATING UNITS

BRAUER REPAIR PARTS — STOVE FURNACE BOILER — OIL STOVE RANGE

A. G. BRAUER SUPPLY CO.
Distributors of All Heating and Air Conditioning Equipment
2100 Washington Ave. St. Louis, Mo.

Allocation Classification System

(*Continued from page* 25)

to the seller and to WPB that he is entitled to use the preference ratings indicated on his purchase order in accordance with Priorities Regulation No. 3. Provisions of existing orders which require a purchaser to furnish his supplier with copies of preference rating orders or other special certifications are all rescinded."

This simplified certification reads—

"The undersigned purchaser hereby represents to the seller and to the War Production Board that he is entitled to apply or extend the preference ratings indicated opposite the items shown on his purchase order, and that such application or extension is in accordance with Priorities Regulation No. 3 as amended, with the terms of which the undersigned is familiar.

.....
(Name of Purchaser) (Address)

By .....
(Signature and Title of Duly Authorized Officer) (Date)

To use this simplified certification, Contractor Drehobl would ask XYZ Trust Company for the same letter as shown and would send the letter to Chicago Furnace Supply Co. as he did previously.

Chicago Furnace Supply Co., in turn, would place on its order to Williamson Heater Co. the same simplified certification.

This new method of certification has an advantage to the jobber in that in extending ratings received to his manufacturer for stock replacement, he can group items by ratings (even if issued under several priority orders such as P-55, P-84, P-19, etc.) on one basketed order.

◆

Adjustable Louvred Collecting Hood

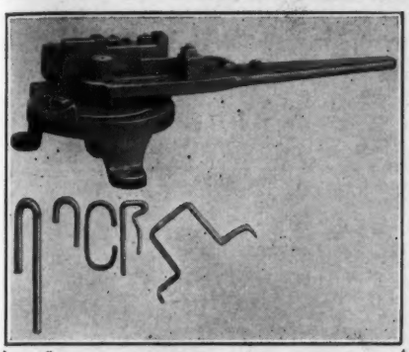
(*Continued from page* 68)

inally used, but due to the high static loss, were early changed to the shaped louver now used on all installations as a power economy feature and to provide rigidity.

In other cases (to counteract drafts, etc.) louvers can be set almost tight together on one end and spaced well apart at the other end toward which dust is naturally drafted. The flexibility and adjustability of these louvers provides for quick changes to conform to the variation in conditions.

The sketch shows one of the several types of movable louvered intake hoods used in the experimental work and incidentally the finally adopted design, many of which have now been installed in industrial plants.

AMERICAN ARTISAN Service Section



THE HINMAN BENDERS
Angle & U, Eye and Pipe
Write for catalog.
manufactured by
L. R. EVANS MACHINE COMPANY
SANDWICH, ILLINOIS

SOLDER
WITHOUT PRIORITIES!
Essco Victory Solder Solves Your Problem Today.
Recently perfected—contains no tin. Flows freely. No priority order needed. As little as 5 lbs. shipped on trial orders at case prices.
Prompt shipments. Act quickly.
Eastern States Supply Co.
Dept. AA
127 Troutman St. Brooklyn, N. Y.

CLASSIFIED

FOR SALE

FOR SALE: Oster Electric die complete ½" to 2" dies, cutter reamer and power take off. Guaranteed first class condition. Address Eugene Moyemont, Dwight, Ill.

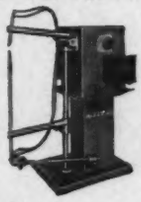
MISCELLANEOUS

PEACE WILL SHOW THAT MANY CHANGES IN AIR CONDITIONING EQUIPMENT have been developed during the war period. Have you a practical idea NOW for improving existing equipment or for new equipment? Complete all necessary patent procedures NOW in order to be a position to negotiate with manufacturers when industrial production is again our primary aim. Send for Free 48-page illustrated book about patents, their sale and other valuable information to help you make your idea practical and profitable. Write today. Victor J. Evans & Co., 674-K Merlin Building, Washington, D. C.

HELP WANTED

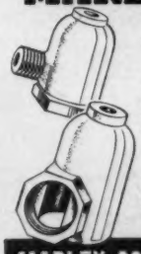
HELP WANTED—MALE—DRAFTSMEN—SHEET METAL with fabrication experience. One who can design jigs, dies and fixtures with plant experience. Also junior tracer-draftsman. Both positions permanent in expanding organization located Johnstown, Pa. Write giving family status, citizenship, experience, past income. Write E. L. Redden, 221 Central Ave., Johnstown, Pa.

WELDING HEADQUARTERS



Electric welding equipment of every description to weld from a watch case to a door. Special or standard SPOT WELDERS from ¼ to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.
EISLER ENGINEERING CO.
CHAS. EISLER
761 S. 13th St. (Near Avon Ave.) Newark, N. J.

Better for Every Spraying Purpose
MARLEY SPRAY NOZZLES



"Tops" for Air Washing, Humidifying, Brine Spray Lofts, etc. Marley nozzles lead all in sales and in profits to you.
*Finer, more uniform spray.
*Effective operation at Low Pressures. *No internal parts to clog or wear.
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Trademark
YAGER'S Soldering Salts — Paste
Reg.
Two standard fluxes for all soft soldering. Safe, quick, certain. Buy them at your jobbers or write us if he cannot supply you.
½ lb., 1 lb., 5 lb. cans; 2 oz., 6 oz., 12 oz.
ALEX. R. BENSON CO., INC., HUDSON, N. Y.

BLOWERS — FANS — EXHAUSTERS
THOROUGHLY REBUILT, for perfect performance. All types; all standard makes. All sizes including the big ones. Hundreds in stock, meeting all requirements. Attractive prices. Fully guaranteed. Expert engineering counsel GENERAL BLOWER CO., Engineers, 403 North Peoria Street, Chicago, Illinois.

NO PRIORITY for ALLEN SILOY SODER
10,000 Lbs. per Square Inch
. . . . recent tests reveal that ALLEN SILOY gives this strength on sodered joints.
SILOY contains little tin, requires no priority. It works well with most common metals . . . . in some cases better than high-tin-content soders.
SEND FOR SAMPLES AND COMPLETE INFORMATION ON ALLEN SILOY SODER TODAY!
If you have a special sodering problem — send along details. We'll be glad to help.
L. B. ALLEN CO., Inc.
6702 Bryn Mawr Ave., Chicago

Save Money, Time and Muscle
Drill Concrete with the "Do-All" Combination Electric Hammer and Drill. Set expansion bolts 10 to 20 times faster than with hand tools. Drills concrete, brick, stone, metal, wood. Easy to maintain. Weighs 15 lbs. Drills to 1⅜" in concrete. 2400 blows per min. Bulletin 400. Phone Austin 9866.
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4644 W. Huron St., Chicago, Ill.

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BRAKES—HAND & POWER
HAND: 4'16, 6'16, 6'14, 8'18, 8'16;
BOX AND PAN: 4'14, 5'14, 7'14;
POWER: 3'3/16", 4'¼", 6'12, 8'12, 8'10, 10'10;
PRESS BRAKES
OHL: 66" 14 ga.; 10' 14 ga.; 6' 14 ga., 5' 14 ga., 4' 16 ga.
Nos. 255 & 335 D&K 4' ¼" Cincinnati;
PRESSES—DEEP THROAT
No. 20 Excelsior; No. 135-A Niagara;
No. 15 Toledo; No. 12 Consolidated;
PRESSES OBI
Nos. 1, 2, 3, 4, 5, Bliss, Walsh, Consolidated, Toledo, Rockford, Niagara;
SHEARS
ANGLE: 6x6x¾" Long & Allstatter;
POWER: 10' 14 ga. Ohl; 6' 14 ga. Kutscheid;
ROTARY: Quickwork 3/16" capacity, 60" Thr. 14 ga.; ¾" Marshalltown Bevel Shear.

WELDERS
BUTT: 5 & 10 KVA WINFIELDS, 55 KVA SWIFT;
SEAM: 25 KVA THOMSON, 22" arms;
SPOT: AEF—15, 13, 10, 9½ KVA, 220 volt 60 cycle, 14", 15", 10" & 18" throats;
27 KVA TAYLOR WINFIELD, 20" arms;
20 KVA ACE, 60 cycle 230 volt, 24" throat;
20 KW THOMSON, 12" thr., 220 v. 60 cycle;
20 KW FEDERAL, 14" thr., 60 cycle 220 volts;
20 KVA WINFIELD, 24" thr., 60 cycle 440 volt;
20 KVA GIBB, M. D., 60 cycle 220 v., 36" arms;
17 KVA THOMSON, 60 cycle 440 volt; 20" arms;
13 & 15 KVA TAYLOR WINFIELDS;
12 KVA ACME, 60 cycle 220 volt, 23" throat;
10 KVA TOLEDO; 10 KVA AMERICAN;
10 KVA TAYLOR WINFIELD;

SEND FOR OUR CATALOG 404
INTERSTATE MACHINERY CO., INC. — YARDS 5800
1433 W. PERSHING RD., CHICAGO, ILL.

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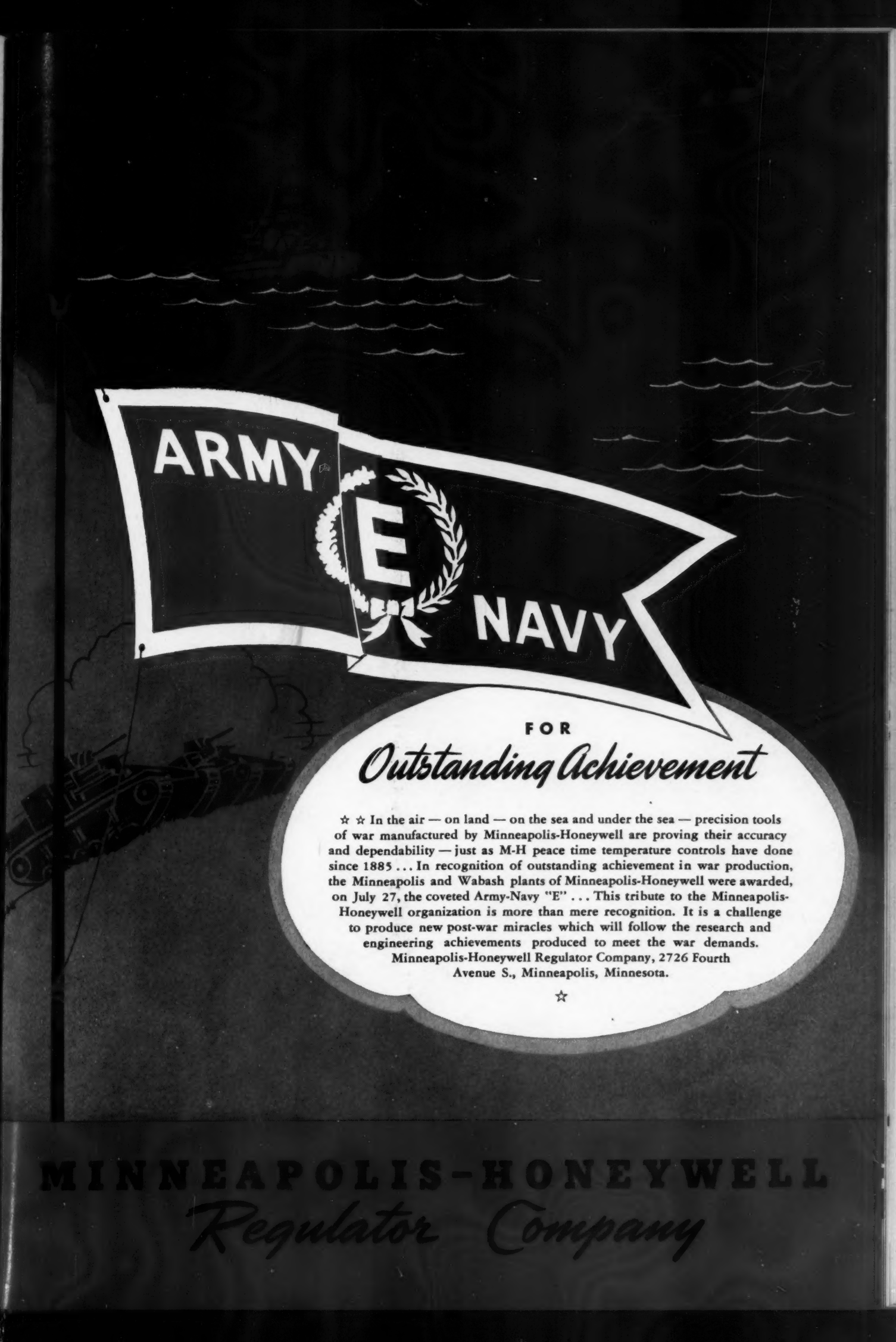

FOR

Outstanding Achievement

☆ ☆ In the air — on land — on the sea and under the sea — precision tools of war manufactured by Minneapolis-Honeywell are proving their accuracy and dependability — just as M-H peace time temperature controls have done since 1885 ... In recognition of outstanding achievement in war production, the Minneapolis and Wabash plants of Minneapolis-Honeywell were awarded, on July 27, the coveted Army-Navy "E" ... This tribute to the Minneapolis-Honeywell organization is more than mere recognition. It is a challenge to produce new post-war miracles which will follow the research and engineering achievements produced to meet the war demands.

Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue S., Minneapolis, Minnesota.

☆

MINNEAPOLIS-HONEYWELL

Regulator Company

MILCOR offers these practical suggestions

—to help you play a more important part in the national drive for SCRAP to hasten VICTORY

Sure, you're saving scrap — and turning it in. But are you getting *all* the scrap? • Your *regular* scrap—that you have always sold to the junk man — isn't enough. Steel mills are hungry for more scrap and again more scrap. Here and there, furnaces are already cold — waiting for *you* — while our enemies advance. • Uncle Sam wants the scrap you used to pay somebody to haul away — the scrap you used to leave on the job for somebody else to clean up — even your customer's own scrap that you see lying around his place. *All of it*—RIGHT NOW. • We can't be satisfied with half measures if we're going to win this war.

No matter how little *extra* scrap *each shop* adds to what is now being turned in, that bit counts when *everybody* cooperates.

G-83

ON THE SHEET METAL JOB . . . pick up *all* the pieces. Sure, it's a nuisance — but it's *nothing* compared with what the boys are doing out there on the battlefront. All our little efforts, combined, can deliver a *big* punch at Hitler.

What's your score?

How many items on this list have you really checked?

In the shop (and on the job)

Scrap pieces of:

- ☐ galvanized iron
- ☐ black iron
- ☐ angle and band iron
- ☐ copper
- ☐ aluminum
- ☐ stainless steel
- ☐ brass

☐ Old worn-out machines

☐ Old worn-out or broken tools

On the heating job

☐ Old furnace sections or broken pieces (cast iron or steel)

☐ Old smoke pipe

☐ Old furnace pipe

☐ Old register faces

☐ Old register boxes

☐ Old boots

☐ Old fittings

☐ Wornout fans

On the sheet metal job

☐ Old conductor pipes

☐ Old eaves troughs

☐ Old roofing sheets

☐ Old valleys, flashings, etc.

IN THE SHOP . . . sort different kinds of scrap into separate bins . . . one for cast iron, one for galvanized, etc. They have to be separated at the junkyard . . . you can help to avoid this delay.

ON THE HEATING JOB . . . Save *all* the scrap . . . leave a clean, good-looking basement and a better-satisfied customer. You are well repaid for the little extra time it takes, by knowing that you help toward our national safety.

MILCOR STEEL COMPANY

MILWAUKEE, WISCONSIN CANTON, OHIO

CHICAGO, ILLINOIS • KANSAS CITY, MISSOURI • NEW YORK, NEW YORK

ROCHESTER, NEW YORK • BALTIMORE, MARYLAND